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SEPTEMBER, 1889.

EDITED BY PROFESSOR SIMONDS;

ASSISTED BY

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CONTENTS.

COMMUNICATIONS AND CASES— Page

Lameness in Horses. By Thomas Greaves, F.R.C.V.S., Manchester . 613

Peritonitis in the Ox. By John Brett, M.R.C.V.S., Mansfield Woodhouse, Notts 619

Roaring. By Major-General C. L. Brown 621

Scabies in Goats. By "Krait" . . 625

PATHOLOGICAL CONTRIBUTIONS—

Pleuro-pneumonia 626

Swine Fever 627

Anthrax . . . . . ib.

Rabies . . . . . ib.

LEADER—

The Muzzling Order 628

FACTS AND OBSERVATIONS—

Dog License in Ireland . . . 629

ORDER IN COUNCIL . . . ib.

EXTRACTS FROM BRITISH AND FOREIGN JOURNALS—

Preventive Inoculation. The Croonian Lecture delivered before the Royal Society by M. Roux, on behalf of M. Louis Pasteur, Membre de l'Institut (*Continued*) 631

The Prevention of Tuberculosis . . 639

The Prevention of Tubercle . . ib.

Typhoid Fever in Dogs . . . 640

Page

Diagnosis of Hendon Disease (Cow-Scarlatina) from other Diseases of Milch Cows, characterised by Sores on their Teats. By E. Klein, M.D., F.R.S. 641

ROYAL AGRICULTURAL SOCIETY OF ENGLAND—

Monthly Council, held July 31st . 650

Veterinary Committee . . . ib.

Quarterly Report of the Royal Veterinary College 652

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION—

Meeting held July 26th . . . 659

"Inflammation as a Reparative Process," an address by Prof. Williams 660

BORDER COUNTIES VETERINARY MEDICAL SOCIETY—

General Meeting held July 26th . . 664

"Tuberculosis, and the disposal of the Body of Victims," a paper read by Professor McCall . . . . ib.

YORKSHIRE VETERINARY MEDICAL SOCIETY—

Quarterly Meeting, held July 19th . 674

"Tuberculosis," a paper read by the President 676

THE FITZWYGRAM EXAMINATION . 684

MISCELLANEA—

The Veterinary School in Stuttgart . ib.

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BOOKS, ETC., RECEIVED.

Animals of the Farm in Health and Disease, by Professor G. T. Brown, C.B.

The Quarterly Journal of Veterinary Science in India, July, 1889.

Agricultural Students' Gazette, August, 1889.

The following foreign publications are to hand:—*Annales de Medecine Vétérinaire*, August, 1889; *Oesterreichische Monatsschrift für Thierheilkunde, und Revue für Thierheilkunde und Thierzucht*, September, 1889; *Archivio per le Scienze Mediche, La Clinica Veterinaria* (Milan), July, 1889; *Giornale Veterinaria Militare*, No. 7; and *Journal of the National Agricultural Society of Victoria*, Vol. IV, No. 47.

Papers received: *Mark Lane Express*, *North British Agriculturist*, *Land and Water*, *The Field*, *Live Stock Journal*, *Bell's Weekly Messenger*, *Agricultural Gazette*, *Farmers' Gazette*, Dublin; *Isle of Wight Times*, *Isle of Wight Observer and Chronicle*, *The Isle of Wight County Press*, *The Andover Observer*, *The Gazette*, Montreal; *The Evening Dispatch*, Edinburgh; *The Bournemouth Visitors' Directory*, *Macclesfield County Herald*, and *The Farm, Field, and Fireside*.

It is particularly requested that in future the British and Foreign Exchange Journals be directed to the Editor of the *Veterinarian*, 22½, Bartholomew Close, London, E.C.

NOTICE TO CORRESPONDENTS.

The Report of the Lincolnshire Veterinary Medical Association arrived too late for publication in the present number.

To ensure the publication of Cases and Communications in the coming Number they should arrive by the 15th of the Month.

Letters, Reports of Cases, etc., may be directed to Professor Simonds or the "Editors," at the Royal Veterinary College, or to the care of Adlard & Son, printers, 22½, Bartholomew Close, Smithfield, London.

All Morbid Specimens should be sent to the College, directed to Professor Axe.

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THE

VETERINARIAN.

VOL. LXII. No. 741. SEPTEMBER, 1889. Fourth Series, No. 417.

Communications and Cases.

LAMENESS IN HORSES.

By Thomas Greaves, F.R.C.V.S., Manchester.

It is my intention to refer to some of the multifarious causes and phases of lameness in the horse, more especially obscure cases, which are more frequently seen than satisfactorily understood. The seat of lameness is often difficult to find out and to diagnose to our own satisfaction. We all of us meet with such cases at one time or another, and it cannot but be interesting and useful to us all to discuss them and become more familiar with their various phases. No man was ever so completely skilled in our profession as not to receive new information from age and experience, insomuch that we sometimes find ourselves really ignorant of what we thought we understood, and see cause to reject opinions and theories we had hitherto considered sound.

I purpose to take a general survey of the subject, and with this view I shall bring forward a variety of instances of lameness arising from abstruse causes, and by directing attention to these cases we may gain knowledge which must be of benefit to us in our daily practice. Some of these cases we can discuss and also apply ourselves to those cases which are more familiar to us, and if some useful facts can be gleaned my great desire will be attained.

Percival in his 'Hippopathology' says, "An observant practitioner will often be able to derive a good deal of information concerning the locality or seat of lameness as the horse stands before him; he sets about inspecting the lame

limb and examining it in every part with his hand. Some lamenesses are perceptible to the eye, and discernible by the eye better than by the hand; others are detectable by the hand alone; while again, there are others that elude detection by either eye or hand, and which can be judged by the action alone, aided by the horse's manner of standing. A quick eye, judging from the general appearance of a lame horse, and from his mode of going even in the absence of any manifest disease or defect to account for the lameness, will very often discover at once the seat and nature of the lameness."

In the 'Transactions of the Veterinary Medical Association' for 1842, p. 52, an interesting case is related by Mr. J. Batchelder. In this case the horse would go sound, but a few minutes' exercise would make him at any and at all times very lame. He was blistered a great many times, fired four times, and also unnerved, all to no purpose. He had fifteen months' rest in a loose box, got sound; he was again conditioned for hunting, when he became lame again. In this case there was observed an artery taking a spiral course over the posterior part of the tendo perforans in company with the communicating nerve. This vessel could be seen at many yards to pulsate inordinately after exertion; the pressure of this vessel upon the tendon had produced a groove on it. The horse was cast, the artery was obliterated by placing a ligature on both ends of it, and in a short time the horse went quite sound, was regularly hunted two seasons, and the lameness did not return.

In the *Veterinarian* for 1847, p. 74, Mr. Gabriel relates a case of lameness in the near fore leg. Blistering, setons, &c., to shoulder, were tried, and rest for four months, without the least benefit. He was considered incurable, and was destroyed. Autopsy showed every part of the limb perfectly healthy; but the liver was only half its natural size, was much increased in density, and studded throughout with small cartilaginous bodies which he called asteroids; these bodies were osseous or cartilaginous in their nature, and were no doubt the cause of the lameness.

In the *Veterinarian* for 1859, p. 591, an interesting case of intermittent lameness in man is related, caused by obliteration of the iliac artery. The patient was fifty-four years old; when he walked for a quarter of an hour he felt in the whole of his right leg a weakness, accompanied with a numbness; and if he continued his walk dull pains with prickling sensation followed in the thigh, leg, and foot, followed by cramp and stiffness of the leg, which he was unable to move.

A short rest and these symptoms would entirely disappear. These attacks would recur five or six times in an hour, but never when in repose, seated, or stationary; locomotion alone would always excite a recurrence of the paralytic attack; this was followed by great prostration, ultimately by vomiting blood, syncope, and death. It was found at the autopsy that a tumour completely obliterated the iliac artery. Several cases are given in French works of lameness in horses caused by obliteration of the aorta and iliac arteries. I have brought this case forward because the patient could speak for himself, and enlighten us as to what our patients feel and suffer.

In the *Veterinary Record* for 1889, p. 366, is described three or four very interesting cases of lameness by Mr. Harold Leeney. The cause or nature of the lamenesses was unknown ; some of the animals were lame thirteen or fourteen months, others three years ; various treatment was resorted to in vain, but by exercise and work the lameness subsided. The writer remarks, "There is little doubt in my mind that others have had the credit of curing lameness as well as illnesses which they have never diagnosed at all."

In the *Veterinary Record* for 1889, p. 12, an obscure case of lameness is so well described by Professor F. Smith that it is both instructive and useful. A horse lame, at times very lame, for one year and three quarters, cause and nature never known, ultimately recovered. I have seen precisely similar cases, after every means have been employed without success, ultimately get well. Had these cases died and been carefully examined they would in all probability have been found to be cases of embolism and pressure on certain nerves.

In the *Veterinary Record* for 1888, p. 146, is a well-described case of embolism. The horse was sound, fell suddenly lame whilst drawing a brougham six miles. He was so lame that he had to be left in a stable at hand. He had rest, fomentation, &c., and in a few days came out of the stable apparently sound, but could be rendered intensely lame by a few minutes' fast trotting. This occurred again and again. The lameness was always of the same nature; *coldness of the leg* was the most noticeable feature. He would walk on his toe, and at each step the fetlock would knuckle over. He would stand with his leg raised two inches from the ground, lifting it slightly but frequently, as if in great pain. Examination *per rectum* showed there was no pulsation of the iliac artery on the affected side. In this case there is no doubt that plugging of the iliac artery existed and was the cause of the lameness.

In the *Veterinary Review* for 1863, p. 656, is recorded a case of intermittent lameness caused by obliteration of arteries. An entire omnibus horse, aged eighteen years old, fell down in his work, was unable to rise, or even to move his fore-limbs. After a short time he got up, and was being led home, but before he had gone fifteen paces lameness showed itself again, and in less than ten minutes his fore-limbs trembled violently, the animal became very unsteady, convulsive movements took place in his head and neck, his breathing was laborious, and the beats of his heart tumultuous; the animal was restless, the expression of his countenance haggard, skin bathed in perspiration, two fore-limbs dry, and skin of limbs *cold*. In half an hour all these symptoms would entirely disappear. Again and again would these symptoms come on and then disappear. He was put to work for a time, and ultimately he died. It was then found that the two axillary trunks were filled with hard resistant clots, which were firmly adherent to the arterial walls; the muscles of the limbs were not blanched, and presented nothing worthy of note, and the nerves were the same.

In the *Veterinarian* for 1875, p. 76, Mr. Wm. C. Ison read a very interesting and useful case of lameness caused by embolism of the iliac arteries before the Midland Veterinary Medical Association. It occurred in a seven-year-old bay entire horse. He fell lame in his hind quarters in a strange manner during the two last occasions of his being exercised. The symptoms were great pain and distress. Presently these symptoms would subside, and he would go quite sound. He could trot, canter, and gallop. Then would come on loss of power in his hind limbs, profuse perspiration; his distress would be intense over his whole body, except his hind quarters, which were *cold* and dry; he knuckled over in his hind fetlock-joints, and in the end he died. The iliac arteries were completely plugged with lymph, and the muscles were of a clay colour.

In the *Veterinary Record* for 1889, p. 464, Mr. H. Gray relates a very interesting case of embolism in a cart mare five years old. This mare was harnessed in a van, but had not proceeded 100 yards before she fell lame on her off hind limb, the lameness becoming worse after going a few yards further; also there was profuse perspiration, roaring, and extreme dyspnœa. The dyspnœa lasted about two hours after resting the mare. After resting six hours she was trotted fifteen minutes before lameness again showed itself. This mare knuckled over at the fetlocks. The limbs became rigid,

neither hock nor fetlock being flexed nor extended. Occasionally there was dragging of the leg like a piece of wood, and the leg became *icy cold*. She evinced pain on the aorta and iliac vessels being pressed on *per rectum*. The right iliac artery was hard and pulseless. This kind of lameness is not very uncommon; it is sometimes called kidney dropped, chinked in the back, bobby backed, broken backed, &c.

In the *Veterinary Journal* for 1888, p. 319, again we have another interesting case recorded by Mr. H. Gray, in a nag horse, nine years old, lame on his near hind limb. This horse was bought in January, worked regularly up to June, when he became lame; he was fired on both hocks and turned out to grass. In a fortnight he could gallop, and was not at all lame; worked well until September, when being driven a short distance he lost control over his hind quarters, had colicky pains, was in a state of profuse perspiration, and there was trembling, knuckling over on his hind fetlocks, back arched; he was groaning with pain, eyes almost starting out of their sockets. These symptoms subsided, and he was put to work. In a week's time colicky pains came on again. This time he rested a week, was then led a few yards, when he suddenly became lame on his off hind leg, the opposite one to that affected before; he now would catch the limb up spasmodically, as in stringhalt. The pulse at the aorta and externa iliacs was feeble, and on manipulating a non-resistant body was recognisable; the external iliac was obliterated and solid, hind limbs cold, *off hind limb icy cold* and paralysed. *Post-mortem* examination proved the correctness of the diagnosis during life. These cases of lameness are not so rare as some would have us believe.

In the *Veterinary Record* for 1889, p. 464, there are related several very good cases of lameness by Mr. Wm. Anderson, of Glasgow, strongly resembling, if not identical with, thrombus or embolism, that is, pressure upon certain nerves, and interference with the circulation of the blood to the limb.

In the *Veterinary Record* for 1889, p. 398, are several deeply interesting cases of lameness by Mr. Wm. Willis, some of them undoubted cases of thrombus or embolism, that is, pressure upon certain nerves, and interference with the circulation.

In the *Veterinary Record* for 1889, p. 433, are recorded cases of paralysis, simulating, if not identical with thrombus or embolism.

In the *Veterinary Record* for 1889, p. 26, is a most instructive and valuable case of azoturia by Mr. Arthur New. This disease is always attended with sudden lameness, loss of

power in the hind extremities, profuse perspiration, and intense suffering. It is a deeply interesting subject to study. Although there has been much controversy on it, it is not yet clear what the absolute cause of the lameness is. Hereafter, as intellectual development advances, it may be found to arise from a species of embolism and pressure npon certain nerves.

In the *Veterinarian* for 1863, p. 601, Mr. C. Dickins, of Kimbolton, writes on joint lameness in colts, attributable to lumbricoid worms. He says, "I do not recollect seeing an adult horse affected." He relates a case of a colt, three months old, very lame on his off hind pastern, increased heat, and very sensitive to the touch. In a few days the animal appeared all right, but in about a week there was extreme swelling, with pain and heat, over the head of the femur of the same limb. This subsided, but after a while he would become bad again. This happened over and over again. In a little time a swelling and pain made their appearance on the point of the left shoulder, on the opposite side from where he was first lame. In a few days he was convalescent again, then he was attacked with gastric pains from which he died. *Post-mortem* examination showed that the duodenum was completely plugged with lumbrici. He calls this a puzzling lameness, and such cases are often symptomatic.

In conclusion, I beg to say that during fifty-five years in my profession I have met with a fair share of these interesting, though often unsatisfactory, cases. The predominating pathognomonic symptoms I have found are suddenness of attack, intense pain, profuse perspiration, knuckling over on the hind fetlocks, and as the disease progresses *the affected limb becomes deadly cold* and helpless. We know no treatment or medicine that can dissolve or remove the clot or renew the liver. My treatment has usually been hot rugs and hot salt in bags to the loins, cathartics and rest; sometimes I have bled with much advantage. Such treatment has been attended with varied results. I have omitted to go into everyday cases of lameness, as I found sufficient matter in the cases I have made extracts from, cases written by experienced and eminent men, who are entitled to our utmost respect, and who have recorded them solely for the benefit of our profession. I say all honour to them and to allied workers. They are the redeeming feature in our otherwise apathetic profession. I have written this paper during moments stolen from an active life in my profession. Life at best is but a fragment; the ablest and

strongest amongst us cannot always use their opportunities as they would. I may have prepared the way for others to sow the seed and reap fruit from the ground. I have furrowed and prepared it for them. The promised land in our noble profession is not yet gained, there are a great many difficulties surrounding the pathway; numerous deserts will have to be traversed and Red Seas crossed before our profession arrives in the Land of Canaan.

PERITONITIS IN THE OX.

By John Brett, M.R.C.V.S., Mansfield Woodhouse, Notts.

In the *Journal of Comparative Pathology and Therapeutics* for June, 1888, Mr. Donald, of Wigton, has drawn the attention of the profession to the fact that, although peritonitis in bovines "has received little attention at the hands of veterinary writers," and is "generally believed to be of rare occurrence in the ox," it is by no means so uncommon as we have been led to expect. I can fully bear out his remarks, which give a very good description of an obscure disease. Those gentlemen engaged in cattle practice will be amply repaid by a careful perusal of his paper.

After three careful *post-mortems* and frequent clinical observations on several others, I feel convinced that a large majority of cases are diagnosed and treated as impaction or obstinate constipation, collateral circumstances often leading to errors in judgment, as the following case will show.

Late one evening a message was received: "Send something for belly-ache in a cow." An ordinary anodyne draught was returned, with instructions to wire in the morning if further help was required. Such being the case, a visit was made the next day. The cow was found lying down, giving a peculiar grunt, and to all appearance suffering from impaction; a small quantity of hard fæces containing a large percentage of rye was the only solid excreta passed during the twenty-four hours previous. Diligent inquiry proved that ten days prior to the illness, whilst thrashing operations were going on, the horsemen had stolen a bag of rye; the horses refusing it, a portion had been given to the cow, which occupied a place adjoining the stable. A brisk cathartic was at once administered, with the result that all the symptoms were found to have increased in severity on the next inspection. She passed small

quantities of fæces, firm at first, watery and fœtid towards the end, and died on the fourth day.

A *post-mortem* made two hours after death showed idiopathic peritonitis. The contents of the stomach and intestines were in a condition suitable for excretion, and in no way favoured the view of impaction, neither do I think the rye was a factor in producing the disease.

Another may be cited as a typical case, tracing the symptoms from the onset to death.—"Just come in and look at a cow, she is not much amiss, for she ate her supper and appeared all right last night, but has given very little milk this morning, she grunts as though it was a stoppage," were the words of a client, which graphically described the early features in this case. The animal, a white heifer, was found lying down, giving a grunt peculiar to the disease, with the abdomen, as it were, pressed firmly on the ground, the posture reminding one very much of a boy with the "belly-ache," the head either rested on the manger or was turned round to the flank, eye normal, nose dewy, pulse hard and frequent (80), respirations quiet, temperature 102$\frac{2}{5}$°, F. She got up very reluctantly and stood with her forelegs extended, back arched, abdomen pinched up, hind legs drawn forward; that position, apparently the easiest to maintain, is very characteristic of the disease; the body was lowered again slowly and with difficulty. The body and extremities were cold and clammy, manipulation of the back and loins produced considerable pain, the abdomen giving little if any response to the hand during the early stages of the disease; twelve hours before death it was very sensitive to the slightest touch. No movement of the intestines could be heard on auscultation; small quantities of bright fæces were passed at intervals. There seemed no desire for food or water. This condition continued with varying periods of exacerbation for four days, the animal persistently lying if left undisturbed, when moved showing the same set of symptoms. No rise of temperature beyond that quoted was recorded, except in one instance the thermometer registered 104° F. at night, but fell to 102$\frac{1}{2}$° the next morning, which was accounted for by the attendant having stupidly given some sewage grass. Twelve hours before death the eye was retracted, muzzle hot and dry, pulse not perceptible, abdomen acutely painful on pressure, the animal getting up with the utmost difficulty, and cringing on hind legs some time before the erect position could be attained. The skin and visible mucous membranes were icteric, the colour altering in depth of tone in the course of a few hours,

the change in shade being very clearly defined, especially about the roots of the tail and anus, the owner remarking on this peculiarity several times. I have noted the same characteristic in the horse.

A *post-mortem* made a few hours after death revealed diffuse peritonitis; the abdominal floor, walls, and parts of the diaphragm were coated with lymph, the liver was congested, but from its appearance on section was of a recent origin. Cold was the predisposing cause of the disease as the history obtained afterwards showed. She had been tied up in a warm place to feed for the butcher, and in due course was sold by auction. Unexpectedly proving in calf, she was resold; and after calving turned out during cold stormy weather into a wet low-lying pasture, without shade or shelter of any sort; my client buying her after this, the illness setting in four days after she came into his possession.

Peritonitis is frequently met with as a sequela of metritis, but it differs in many important particulars from peritonitis arising *per se;* the temperature alone would almost differentiate the two conditions.

ROARING.

By Major-General C. L. Brown, late Bengal Staff Corps.

Without wishing to detract from the credit due to Dr. Fleming for having brought to perfection an operation for the cure of roaring, I have written the following remarks to try and convince the owners of horses that the operation alluded to would not be necessary but for the intervention of human meddling and muddling.

The operation reminds one of how in former days they would cut a soldier's back to pieces with the lash, and then set to work and cure him. But we need not go back two or three generations, we have only to inquire at any of the London hospitals and we shall soon ascertain how many toes have been amputated to give relief from distortions engendered by wearing boots with high heels, narrow soles, and pointed toes. I have been credibly informed that much trouble and torture would be obviated if all votaries of fashion would consent to the amputation of the second toe before the boot which befits the time is placed on the foot.

Roaring only owes its existence to injudicious and haphazard practice, and if I can by any means cause inquiry to be made, and our equine slaves protected from one of the

many cruel devices custom and fashion have in store for them, I feel I shall have done my duty.

"Roaring results in every case from diminished area in the upper air passages either in the larynx or trachea. Perhaps in eight cases out of ten the seat of obstruction to the free passage of air is in the larynx, and is caused by atrophy of the muscles which normally dilate that organ by opening the cartilages. These failing to act, the free passage of air through the larynx is obstructed, and the noise called roaring results. The atrophy of the muscles referred to is itself the effect of paralysis of the recurrent nerve or motor branch of the larynx."

The above is quoted from the writings of Inspecting Veterinary Surgeon Alfred J. Owles.

I may here remark before I go any further that we are much indebted to the veterinary profession for the amount of care and trouble they have brought to bear on their endeavours to ascertain the cause of roaring. No exception can be taken at the amount of diligence they have displayed and the profundity of their knowledge of morbid anatomy; but beyond finding that the recurrent nerve becomes paralysed they have not discovered how to prevent the paralysis, or else they are keeping their knowledge to themselves.

The question, as it appears to me, is, are you not putting the cart before the horse? or in other words, are not the abnormal conditions of the muscles and the other tissues the cause of the paralysis and atrophy of the nerve?

We know that if we do not use our talents the power of using them, even if we once possessed them, passes away. We know that horses at work in coal-mines after awhile become blind, because they cannot use their eyes. I am given to understand that this amaurosis is the result of paralysis of the optic nerve. We know, I repeat, that this paralysis is brought about by not making use of the sense of vision, and yet anatomy inverts the whole thing and tells us that amaurosis is in the want of power in the optic nerve. It seems as if there were a sort of reciprocity between the muscles and the motor nerves: if one fails in its duty the other goes off in atrophy.

May it not then so be, that the recurrent nerve becomes paralysed, because the muscles and cartilages having become inflamed from other causes find it irksome, not to say impossible, to perform their functions?

The fact remains that roaring results from diminished

area in the air passages and all measures for prevention or cure ought to tend to dilating or keeping open these passages, and to avoid anything and everything likely to cause contraction; in short, our efforts ought to be directed to using such measures as shall, without interfering with the normal structure, relieve the congested tissues; this congestion being the concomitant of strangles, sore-throat, catarrh, cough, &c., the usual forerunners of the infirmity known as roaring.

I will endeavour to explain that the measures now in general use for affording relief are fallacious.

It may so be that the first warning of rocks ahead may be a swelling, the sign of strangles, or there may be a cough.

I am much misinformed if a blister is not applied in all cases of strangles to bring the swelling to a head. I beg to place on record that since the year 1858, when I was not satisfied with the action of blister, I have invariably used internal remedies, the result in every case being highly satisfactory.

With reference to cough. Cough is only a symptom of some other dyscrasia. It may arise from bronchitis or from the stomach. Still, according to custom that cough must be tackled, and no inquiry is made as to the *fons et origo mali.* Instead then of trying to find out the cause of cough, and to avert that cause, the usual practice is to go straight at the throat and invoke the aid of liniments, embrocations, and blisters.

So also when a horse is broken down, after the first inflammation has subsided on goes the omnipotent embrocation or all mighty blister, the effect being that the skin and all the tissues under the skin become contracted and a medicinal bandage is formed. This is known; it is evident to the eye, and yet the same or a cognate blister is clapped on the throat, just as if it could at the will of the practitioner have a contracting tendency on one part of the frame and have no such tendency on another part.

Notwithstanding this self-evident property of blisters, there is one veterinary surgeon who is not ashamed to put forth in public print that "counter-irritation would tend rather to retard than to hasten the development of roaring. Stimulation in the region of the muscles of the larynx would for a time preserve their nervous activity and so delay the subsequent paralysis." Can the teacher of this precious doctrine, this haphazard practice, lay his hand on any case of paralysis which has been retarded by blisters? Why are not all persons so afflicted subjected to this treatment and

cured or even have their sufferings alleviated? Why should the nervous system about the larynx have this distinction, more than the nervous system of any other part or even if he can by any means satisfy his admirers on this point, how is he going to get over the contracting tendency of the blister, and keep the air passages open?

Some horses can stand this treatment, others cannot, and rebellion against the treatment manifests itself in the recurrent nerves becoming paralysed and incapable of working on the muscles in and about the larynx, and the skin having become contracted and the area in the upper air passages diminished, the horse is manufactured into a roarer. Because then some horses can withstand this heroic treatment, and others cannot, the treatment is not condemned, but the entire blame is cast on the horse for not being able to withstand the treatment; further than this the profession, having no other loophole through which to wriggle themselves, have issued the manifesto, "Roaring is hereditary."

It is pitiable to observe the subterfuges adopted by the medical profession in their endeavours to account for the success attending the practice of those persons whose tenets differ from their own, and yet whose results are more satisfactory than anything to which they have been accustomed, or when there are certain phenomena for which they cannot give a satisfactory explanation.

When it was brought to the notice of the civilised world in general and the faculty in particular, that the abstraction of blood as a curative agent was to be deprecated, there was much discomfiture in the ranks of the profession, till one professor was able to soothe their sorrows by hitting off and promulgating this wonderful theory, "that the abstraction of blood has been carried on for so many generations that blood-letting was no longer necessary," or in other words that "man had made that perfect which the Creator had left imperfect."

There might have been some foundation for this specious argument had every nation been given to blood-letting, or if the *feræ naturæ* had been accustomed to bleed themselves, but how about those nations which have always had an aversion to blood-letting, and the wild animals which knew nothing about it? Yet it is now universally acknowledged that every drop of good wholesome blood is too valuable to be withdrawn from the system.

Now, as regards roaring, it is not necessary that a horse should have been descended from a roaring sire to be him-

self a roarer. The first and worst roarer I ever saw was an Arab, made into a roarer by the skill and handiwork of a qualified veterinary surgeon.

A roaring sire shall and does propagate certain idiosyncrasies, which tend to roaring, but that is the greater reason why precautionary measures should be used to prevent the dreaded disaster.

To be forewarned is to be forearmed, and yet though it is feared a colt may suffer, nothing is done for the poor is-to-be sufferer beyond using further counter-irritation and stronger blisters, and then when the day comes all the consolation afforded is, "Didn't I tell you so? His sire was a roarer, so is he."

The sire may perhaps give his progeny a tendency to cough. Instead of regarding that cough as one of nature's guideposts to show us that there is a something abnormal which must be rectified (that something may be in the horse himself, or it may be fault of management) the stable mind is bent on upsetting this effort of nature. They (that is all and everyone who flatters himself that he knows what to do with a horse that coughs) evidently imagine, with the first weapon that comes to hand if they can put a stop to that cough, the other parts of the body must go right.

Here again the cart is put before the horse. I humbly submit that it ought to be, "Put the rest of the body right and the cough will disappear;" and if this be done in a proper manner, there will be no closing of the air passages, and as a matter of course no roaring.

[We refrain from making any comments on this article, which is inserted at the special request of the author.—Eds.]

SCABIES IN GOATS.

By "Krait."

During the past month two outbreaks of sarcoptic scabies, which is very common in goats in India, have come under my observation, and I have been greatly impressed by the virulent character of the disease, its extreme contagiousness, the resistance which it offers to treatment, and the ease with which it is communicated to man. The symptoms first noticed are that the animals are continually scratching, rubbing, and gnawing themselves, due to the amount of pruritus which the parasite gives rise to. Vesicles appear

on the thighs, ears, and face, and are rapidly succeeded by pustules and scabs. The hair comes off, and the itching causes the goats to scratch off the scabs, leaving angry-looking surfaces from which exudes a yellowish serous fluid. Loss of condition is rapid, and in some cases much febrile disturbance is noted. Death often occurs from six weeks to two months, apparently from exhaustion.

In one herd of thirty-eight goats of the usual long-haired mountain type belonging to the man in charge of the dâk bungalow at Bagi, on the Hindustan Thibet Road, the disease had carried off all but seven; and these were in the last stage, death being imminent.

The man consulted me with regard to the herdsman who had contracted the disease from dressing the goats. He had anointed himself with the usual mixture well known to the natives of sulphur and clarified butter, but with no beneficial results. His arms and legs were covered with scabs and raw surfaces. He was suffering from irritation caused by the intense pruritus, which also caused sleeplessness. I sent him into the nearest dispensary at Kotgum.

The other case, which occurred in Lahore, was one of a herdsman who had thirty-four goats. These were treated by the application of perchloride of mercury to some sheep, and dip to others; only nine recovered. The herdsman in this case also contracted the disease on the neck from carrying the goats which were too weak to walk. It was noticed in time, however, and succumbed to carbolic applications.

Pathological Contributions.

PLEURO-PNEUMONIA.

In Great Britain between the end of June and August 17th (a period of seven weeks) there have been 96 fresh outbreaks of this disease, viz. 38 in England and 58 in Scotland. The outbreaks in England occurred in the counties of Essex, Kent, Lancaster, Leicester, Middlesex, Norfolk, Northampton, Surrey, Sussex (East), and York (West Riding), while those in Scotland took place in Aberdeen, Ayr, Clackmannan, Edinburgh, Fife, Forfar, Kincardine, Lanark, Perth, and Renfrew.

The total number of cattle attacked with pleuro-pneumonia during the seven weeks was 282, of which 126 were

in England and 156 in Scotland. In addition to the above there were 1369 healthy cattle slaughtered because they had been exposed to the risk of infection; 730 of these were in England and 639 in Scotland. In Ireland during the period above referred to there were 7 fresh outbreaks of pleuro-pneumonia reported; they all occurred in the counties of Dublin and Meath. The number of cattle attacked was 7, and 35 healthy cattle in contact were also slaughtered.

SWINE FEVER.

In the first seven weeks of the present quarter 797 fresh outbreaks of this disease were reported in Great Britain, nearly all of them in England. There were 3930 swine attacked; 1972 diseased swine were killed, 1576 died, 365 recovered, while 358 remained when the last published return was made up. In Ireland 40 fresh outbreaks of swine fever were reported in the seven weeks, and 99 swine were attacked.

ANTHRAX.

In Great Britain 15 fresh outbreaks were reported in the seven weeks, 14 in England and 1 in Scotland. Of 22 animals attacked 18 were in England, 16 of which died, 1 was killed, and 1 remained alive. At the date the last return was made up all the four animals affected in Scotland died. In Ireland only 2 fresh outbreaks of anthrax were reported, in which 3 animals were attacked. The above figures are exclusive of those connected with a serious outbreak of disease among the deer in Ickworth Park, Bury St. Edmund's, which was at first supposed to be anthrax, but the true nature of which has not been definitely settled.

RABIES.

In England 72 cases of this disease were reported in the seven weeks, 67 in dogs, 2 in cattle, and 3 in pigs. The cases in cattle and swine were in York (West Riding), while the cases in dogs occurred in the counties of Chester, Essex, Hants, Herts, Kent, Lancaster, Lincoln (Kesteven), Lincoln (Lindsey), London, Middlesex, Oxford, Surrey, Warwick, and York (West Riding).

In Ireland 54 cases of rabies were reported, 38 in dogs, 11 in cattle, 2 in pigs, and 3 in donkeys.

THE VETERINARIAN, SEPTEMBER 2, 1889.

Ne quid falsi dicere audeat, ne quid veri non audeat.—CICERO.

THE MUZZLING ORDER.

IN another part of the Journal (p. 629) we publish an Order of Council which is a novelty, not in legislation, but in the administration of the law.

The London County Council, as everybody is aware from the published correspondence, failed to carry into effect the Order of the Privy Council providing for the muzzling of all dogs being at large within the Metropolitan Police District, a space of something like fourteen or fifteen miles round London, including the metropolis, the whole of Middlesex, and parts of Herts, Essex, Kent, and Surrey. Each Local Authority is bound under the Contagious Diseases (Animals) Act of 1878 to execute all Orders of Council, and it appears that excepting the Local Authority of the county of London no difficulty occurred. The London Authority alleged that not having any control over the police they had no means of enforcing the Order, and accordingly they declined to act, or, at any rate, neglected to act, and the Order for some days after it came into force was to all intents and purposes a dead letter. Under these circumstances the Privy Council proceeded under Section 41 of the Principal Act to appoint a Commissioner to execute and enforce the Order in the manner provided in the Order which we publish in the present number.

Major Tennant, the Chief Travelling Inspector of the Privy Council, is the Commissioner who was appointed to act in the place of the Local Authority of London, and the immediate result of his appointment was the publication of notices in the Metropolitan Police District, and the general enforcement of the Order in that area. A large number of dogs have been seized by the police and sent to the premises of the different veterinary inspectors, whence those which are not claimed are forwarded to the Dogs' Home in Battersea.

It is rather early to boast of the inhibitory effects of the Muzzling Order, but the *Gazette* returns of cases of rabies, which for some weeks previously had steadily increased, suddenly fell to zero. For the week ended August the 17th no cases of rabies were returned, and it is evident that very few wandering dogs are left in the district.

It s an unfortunate outcome of the necessary procedure of the police that a considerable number of the men have been bitten. Of course the majority of the dogs which have been seized were not rabid, but some of them were believed to be, and it is to be feared that some of the police have incurred the risk of becoming infected with that terrible disease. This is the more to be deplored, as the use of thick leather gloves, the cost of which would not be ruinous, would obviate all danger of serious injury to men who in the public interest are doing work which is certainly outside their ordinary occupation.

Outcries against the use of the muzzle are less sonorous than they were on the last occasion two years ago, but the old arguments are advanced, "Muzzling tends to drive dogs mad," "Rabies is a disease of spontaneous origin, and can only be checked by sanitary measures," and so forth. Nothing is to be gained by discussing these fallacies seriously, because those who advance them are not open to reason, and it is satisfactory to notice those who are most interested in the welfare of the canine race and know most about them support the system, and even contend that it should be extended to the whole country.

For our own part we do not hesitate to assert that in a country like ours rabies is a standing disgrace to our sanitary administration which might easily be removed if people could only be got to see the necessity of uniform action for the purpose. No very serious hardship would be inflicted if all the dogs in the kingdom were muzzled for a year, and before that period had expired rabies would have ceased to afflict the canine race, and be inflicted by them on man.

Facts and Observations.

The Dog License in Ireland.—During the year 1888 335,325 dogs were registered in Ireland. The total amount received for dog license duty for the year was £36,033 4*s*. 2*d*.; dividends on investments of money previously received amounted to £92 9*s*. 8*d*.; making altogether £36,125 13*s*. 8*d*.

ORDER IN COUNCIL.

At the Council Chamber, Whitehall, the 12th day of August, 1889. By Her Majesty's Most Honorable Privy Council.

Present:—Lord President, Viscount Lewisham.

Whereas by the Contagious Diseases (Animals) Act, 1878, it

is enacted that every Local Authority shall execute and enforce that Act and every Order of Council as far as the same are to be executed or enforced by Local Authorities, and that where a Local Authority fail to execute or enforce any of the provisions of that Act or of an Order of Council, the Privy Council may by order empower a person therein named to execute and enforce those provisions or to procure the execution and enforcement thereof:

And whereas it is further enacted by sub-section four of section fifty-eight of the Contagious Diseases (Animals) Act, 1878, that every Order of Council shall be published by and at the expense of every Local Authority to whom it is sent by the Privy Council for publication in such manner as the Privy Council direct, and, subject to and in the absence of any direction, by advertisement in a newspaper circulating in the district of the Local Authority:

And whereas by Article 182 of the Animals Order of 1886 it is provided that where an Order of Council is so sent by the Privy Council to a Local Authority for publication, the Order shall be published by that Local Authority either by advertisement in a newspaper circulating in the District of that Local Authority, or by means of handbills containing a copy of or a full abstract from such Order of Council either distributed to persons affected by the Order or affixed to places where local notices are usually exhibited in the District of that Local Authority, or in such other manner as the Local Authority consider best fitted to ensure publicity for the same:

And whereas on or about the thirteenth day of July, one thousand eight hundred and eighty-nine, the Privy Council sent for publication to the London County Council, being the Local Authority for the County of London (excluding the City of London), The Rabies (City and Metropolitan Police Districts) Order of 1889, being an Order made by the Privy Council under the Contagious Diseases (Animals) Acts, 1878 to 1886, and the Rabies Order of 1887, but the said Local Authority have failed to execute the provisions of the said Act of 1878 and the said Order of 1886, inasmuch as they have not published The Rabies (City and Metropolitan Police Districts) Order of 1889, as required by the said Act of 1878 and the said Order of 1886:

Now, THEREFORE, the Lords and others of Her Majesty's Most Honorable Privy Council, by virtue and in exercise of the powers in them vested under The Contagious Diseases (Animals) Acts, 1878 to 1886, and of every other power enabling them in this behalf, do order, and it is hereby ordered, as follows:

1. Major John Trenchard Tennant, Chief Travelling Inspector of the Privy Council, is hereby named and empowered to execute and enforce the provisions of sub-section four of section fifty-eight of The Contagious Diseases (Animals) Act, 1878, and of Article 182 of The Animals Order of 1886, so far as the same relate to the publication by and at the expense of the London

County Council of the Rabies (City and Metropolitan Police Districts) Order of 1889.

2. In this Order terms have the same meaning as in The Animals Order of 1886. C. L. PEEL.

Extracts from British and Foreign Journals.

ON PREVENTIVE INOCULATION.

The Croonian Lecture delivered before the Royal Society by M. ROUX on behalf of M. LOUIS PASTEUR, Membre de l'Institut.

(*Continued from* p. 571.)

Gentlemen, what results were won, what new ideas gained by this single experiment on the culture of the microbe of chicken cholera? By it M. Pasteur showed us that the viruses of infectious diseases are no more the unchangeable entities they were before imagined to be. He taught us that, like all other living beings, the microbic virus is susceptible of modifications which heredity perpetuates, that it is above all the virulent character which becomes modified, and finally that this modification can be produced artificially and regulated according to the wishes of the experimenter. By this experiment M. Pasteur established the attenuating influence which the air possesses; at the same time he explained how it is that the activity of a virus, under natural conditions as seen in epidemics, is preserved or exhausted, and how the same malady may be sometimes malignant, sometimes light.

We have seen how fowls inoculated with attenuated cholera virus, suitably chosen, took the light form of the malady and soon recovered. If, now, you inoculate these recovered fowls with blood from a fowl dead of the virulent disease, and at the same time you inoculate a number of fresh fowls, you will find that all the fresh fowls will die, while those previously inoculated with the attenuated virus will resist the disease. They will merely have a passing illness, which soon disappears. The inoculation with the attenuated virus has rendered them exempt from the fatal form of the disease; it has given them immunity; and if, in the same animals, you make successive inoculations of increasing intensity, you will make them refractory to cholera to such an extent that you may inoculate them with the most virulent blood, under conditions where they would be exposed to the most intense natural contagion, and they will not

experience the least inconvenience from it, and it will be impossible to kill them by this illness, which was formerly so formidable.

The attenuated virus therefore discovered by M. Pasteur is quite as efficacious against chicken cholera as Jenner's vaccination against smallpox. But while we are ignorant of the relations between smallpox and vaccine, none of the relations between the vaccine virus of fowl cholera and the virulent virus are hidden from us.

This plan, moreover, is not only successful in the case of chicken cholera, but constitutes a definite method of attenuation of virus, the value of which has been proved by the production through its means of the vaccine of another malady more interesting than fowl cholera, as it is both a scourge for cattle and can also be transmitted to man. I mean splenic fever, anthrax, or charbon, for it is by the regulated action of heat and air upon the anthrax virus that the vaccine of this malady has been obtained; but in the case of anthrax a difficulty arose which was not present in that of chicken cholera.

The anthrax virus is found in the blood of animals which have just died of the disease. Cultivated in veal broth, slightly alkaline, it forms a culture resembling cotton-down swimming in a clear liquid. This down is formed by long and interwoven filaments, as you see them in the photograph. In the interior of these filaments, after some hours, you see bright spots beginning to appear, the outline of which become more and more distinct. These brilliant spots are the germs or spores of the bacillus discovered by M. Koch; these spores are the veritable seeds of the microbes, and as grains of corn, for example, offer more resistance to heat and dryness than does the growing corn, so the spores can bear without perishing a temperature of 90° C., and the action of a number of agents which would kill the bacteride in its filament stage. The spore is thus the resistant condition of the microbe of anthrax, and wherever it finds conditions favorable to germinating, either in the body of an animal or in some artificial nutritive culture, it will give forth filaments, and these in their turn will produce new germs.

If we expose the anthrax bacillus to a temperature of 38° C. and the contact of the air, as we did the microbe of fowl cholera, its virulence will not diminish. Even at the end of a long period it would still kill all the men and animals into whom it was inoculated. It consequently appears that the oxygen of the air is in this case unable to

exert its attenuating influence, because the spores which are formed during the first hours of the culture are able to resist its action. In order therefore to repeat the conditions analogous to those which were successful in the chicken cholera, we must first prevent the bacilli from producing spores. The way to do this is by cultivating anthrax, not now at a temperature of 35° C., but of 42° to 43° C. Under these conditions the bacilli develop, producing the filaments, but no spores. If we try every three days, for example, the intensity of the virulence of a culture thus made at a high temperature, and in which no spores are formed, by inoculating it into sheep and rabbits, we shall find that in the first days of the experiment all the inoculated animals succumb; then that the virus becomes less active, and the sheep resist, while the rabbits still die, though after illnesses more and more prolonged. After a still longer period, the culture made at 42° loses its danger for the rabbit, but is still fatal to guinea-pigs and to mice. Finally the moment arrives when it is quite harmless even to these little rodents, very sensitive to the anthrax virus as they are. We here see, as with fowl cholera, the virus passing through all the stages of decreasing virulence, and finally becoming harmless. The bacilli, which at a high temperature give off no germs, yet form them rapidly if cultivated at 30° or 35° C., and the spores which are then produced preserve the same degree of virulence as the filaments from which they were derived. It is therefore only necessary to draw off each day a little of the culture from the bottle at 42°, and to place it in *bouillon* at 85° C., in order to have a series of cultures of graduated virulence and furnished with spores capable of fixing each of these special degrees of intensity. The sheep and oxen which receive these attenuated bacterides exhibit a passing fever, but if, later on, you inoculate them with virulent virus, it has no effect upon them. One has therefore only to choose among the degrees in this scale of virulence that which will give to the animal one is desirous of protecting from anthrax an illness slight but sufficient to ensure the desired exemption. In practice the vaccinations of oxen and sheep are done twice. The virus of the first inoculation is very attenuated, and is intended to prepare the animal for the action of the second and more energetic inoculation, which is prepared twelve days after the first. The whole difficulty in anthrax inoculation consists in the choice of these two viruses, and in keeping the relation between their degrees of virulence invariable. Everyone still has in his remem-

brance the striking demonstration of the efficacy of these preventive inoculations given at Pouilly-le-Fort in 1881. Five-and-twenty sheep, chosen promiscuously from among fifty, were inoculated with attenuated virus of anthrax, and afterwards with the virulent virus at the same time that twenty-five other fresh ones were inoculated as a control experiment. The twenty-five vaccinated sheep remained healthy; the twenty-five control sheep died of anthrax. Demonstrative as this experiment was, it did not obviate violent attacks, the first of which was against the principle of the method.

The possibility of obtaining attenuation of the anthrax virus under the conditions laid down by M. Pasteur was denied. It is, however, unnecessary to dwell upon this point, as it is admitted even by those who contested it, for example, Koch and others; and the attenuation of the bacilli cultivated at 42° C. has become a classical fact. The answer to lay criticism is to be found in these tables, which give the number of animals inoculated in France since 1881.

TABLE I.—*Animals Vaccinated against Anthrax.*

Years.	Sheep.	Oxen.	Mortality among Sheep.
1882	243,199	22,916	1·08 per cent.
1883	193,119	20,501	0·77 „
1884	231,693	22,616	0·97 „
1885	280,107	21,073	0·90 „
1886	202,064	22,113	0·75 „
1887	293,572	42,538	
1888	269,599	34,464	

The mortality among sheep before the preventive vaccination for anthrax was 10 per cent.; since that period it has fallen to less than 1 per cent.

It shows how firmly established these inoculations are in agricultural practice, while the rise in their number is the most convincing proof of their efficacy. The farmer, of course, cares nothing for scientific discussions. For him, preventive vaccination is judged entirely from the standard of profit and loss; and in eight years he has had ample opportunity of coming to a definite conclusion on this point. The mortality among sheep in the anthrax districts has gone down from 10 per cent. to 1 per cent. Insurance companies insert a clause in their agreements making preventive inoculations of the insured cattle obligatory; and in Austria, Italy, and Spain the vaccinations are beginning to be widely adopted. What better arguments could be adduced to prove the great service which the discovery has rendered to agriculture? But I do not desire to dwell on

this point, and will proceed, having already discussed the attenuation of the virus, to consider the fact of its return once more to the virulent condition.

If in nature we were to come across one of these attenuated bacteria which we have learnt to prepare, and which are so harmless as to be incapable even of killing a mouse, it would clearly be impossible for us to recognise in this inoffensive microscopical object a descendant of the terrible *Bacillus anthracis*. To do so it would be necessary to have watched it in its stages of gradual attenuation. It is, however, possible (always supposing that the process of attenuation has not been carried too far) to make the bacillus reascend the steps of virulence down which it has come, and so to render it once more virulent.

We have stated that it was not capable even of killing adult mice; but let us inoculate with it a very young mouse, only one day old. This young mouse will be much more sensitive to the action of the virus than the grown-up one would be, and it will die in a few days. In developing itself in this young mouse, the bacillus will have recovered a portion of its old fitness for life in living surroundings; and the blood of this first mouse introduced into that of one a little older will cause its death, and thus proceeding step by step from the youngest mouse to the oldest, it will gain power to kill first old mice, then guinea-pigs, rabbits, sheep, and, last of all, oxen, which are among herbivorous animals the most callous to the action of anthrax.

Thus we see that we can increase the virulence as easily as we can diminish it; and that it manifests itself by the increasing power of the microbes to germinate in the bodies of living animals, a power which can thus be either acquired or lost under respectively appropriate conditions. That this increase of virulence which we have thus excited is going on in nature we can well imagine; and that a microbe, at first harmless for a particular kind of animal, should afterwards become dangerous to it. Given that some fortuitous circumstance should have introduced it into an animal with but feeble power of resistance, and it will grow there. This first cultivation will adapt it to parasitic life; it will pass out ready to develop in an organism in which it could not previously have gained a foothold, and after several such passages it will become really formidable.

There is no rashness in believing that by such means in the course of ages new forms of virulence have been evolved, and that these experiments on the variation of virulence throw a flood of light on that most obscure of questions,

the origin of new virulent diseases. For these results also explain how one and the same kind of microbe can produce such diverse morbid effects; how, in its active or virulent state, it causes a general disease, rapidly ending in death, and in its passive or attenuated condition produces nothing more than a special local lesion.

Other viruses have also been attenuated by this method of the action of the air upon the cultures. At the Congress held in Geneva in 1882, M. Pasteur cited a whole series of fresh examples. I shall, however, only speak to you of the attenuated virus of a special form of swine fever, a disease much dreaded by farmers, and known in France by the name of *rouget*,* as the sick animals are distinguished before death by red patches on the skin.

The microbe of *rouget* is a bacillus which is found in the spleen and the lymphatic glands of the swine which die of the disease. In cultivation it produces no spores, and is therefore specially amenable to the influence of the air, and in fact, if left long enough exposed to its action, its virulence is totally destroyed. But there is a further method of attenuation discovered by MM. Pasteur and Thuillier, and which is of great interest, as it shows the changes which a virus may undergo in its passage through animals of different kinds. *Rouget* injected into a rabbit kills it within a few days. A small quantity of the "pulp" from the spleen of this rabbit inoculated into a second one will cause death still more quickly, and the disease can thus be passed through a whole series of rabbits. But the extraordinary point (discovered by MM. Pasteur and Thuillier) in these inoculations is that, as the strength of the virus increases for the rabbit it is diminished for the pig; so much so that, after a sufficient number of passages of the virus have been made through the rabbit it has become a vaccine for swine, able to confer upon them exemption from the fatal form of malady.

With this example before us, the question arose, What would happen with certain human diseases if we made them also pass through a great number of different kinds of animals? Is not this very process taking place in Nature, and does it not give fresh support to the idea that the vaccine of smallpox becomes modified by its passage through the horse and the cow?

After all this work upon the prevention of fowl cholera,

* This form is known in Ireland as "red soldier," and is not the same disease as the pneumono-enteritis called "swine fever" in this country. —TR.

anthrax, and swine fever had been accomplished, M. Pasteur devoted himself to the study of rabies. When, in 1880, the study of this disease was begun in M. Pasteur's laboratory, the following facts concerning it were alone known: that it was an infectious disease; that the virus was contained in the saliva of rabid animals, and that it was transmitted through their bites. We knew also that the period of its incubation varied from some days to some months, and here our definite knowledge of its pathology ended. Many experiments, however, had been made on the subject, but two causes had rendered them especially difficult to carry out and their success uncertain.

Inoculation of the saliva of a rabid into a healthy animal does not always produce rabies, but often has no effect whatever. Among animals susceptible to the malady, some only become rabid after such a lapse of time that the prolonged waiting, combined with the uncertainty of the results, puts the patience of the experimenter to a most severe test. The saliva of a rabid animal affords an untrustworthy virus, because it contains a quantity of different microbes, which, when introduced under the skin contemporaneously with the virus of rabies, may prevent the development of this latter, and set up inflammatory processes originated by their growth. The first thing to do therefore was to find some source of the virus of rabies which should be uncontaminated by other microbes. All the symptoms of rabies arise from the disturbance of the nervous system; hence the idea that in that system the rabic virus was specially to be found presented itself to the mind. The previous attempts made, however, to show that the nervous system of a rabid dog was virulent were unsuccessful, because the manipulations to which the nervous matter was exposed in order to inoculate it introduced into it those other microbes which it was essential to exclude.

By inoculating with absolute purity from the spinal cord the brain or the nerves of an animal which had died of rabies, M. Pasteur demonstrated that the true seat of the virus was to be found in the nervous system. A portion of the nerve centres of a rabid dog injected subcutaneously into a healthy one will produce rabies more surely than the most active saliva. This demonstration enabled us to take a decided step forward in its study. The rabic virus being contained in the nervous centres, and the symptoms depending entirely upon that system, the idea naturally followed that the disease only shows itself when the nervous centres are attacked by the virus. Further, that the incubation

period is governed by the time taken by the virus to travel from the point inoculated up to the cerebro-spinal axis and for its development therein. If, therefore, the virus be inserted directly into the nervous system, where it has to develop, the incubation ought to be shortened and the disease follow with certainty, because the virus can no longer be destroyed or diverted from its course during its long journey.

Gentlemen, experiment has fully confirmed this theory, as may be seen from the record of the first dog inoculated by trephining, in which the incubation period was reduced to fourteen days. In fact, any dog inoculated under the dura mater with a little of the spinal cord or brain of a rabid dog takes rabies with absolute certainty and within a period rarely extending beyond eighteen days. Thus we are delivered from the uncertainties belonging to subcutaneous inoculations and from the weariness of a long incubation period. After the experiment the study of the disease went rapidly forward; it was proved that the virus existed in the nerves and that by that route it travels from the original wound to the brain and spinal cord, and also that it can in some cases be conveyed by the circulatory system. It will be seen, therefore, that the manifestations of rabies may be varied, as the manifestations of the disease in the beginning will depend upon the particular region first encountered by the virus, and finally why it is that there are forms of the disease which until now were unrecognised, and which differ from the classic type. The operation of trephining is in itself harmless when performed with proper antiseptic precautions. It is as successful with the rabbit as with the dog. If inoculation by trephining is performed upon a series of rabbits from the spinal cord or medulla oblongata of an animal which has just died, and this process is continued with successive animals, we find that the duration of the incubation period, which was at first from fourteen to eighteen days, gradually diminishes. It becomes shorter and shorter as the number of passages of the virus increases, until, at the end of a hundred of the successive inoculations, it has gone down first to seven days, and finally to six. At that point it remains stationary, the rabic virus seeming then to have attained its maximum virulence for that animal (the rabbit), and the virus is said to be "fixed." It is from this "fixed" virus that M. Pasteur obtains his vaccine for rabies by a process similar in several details to that already used for attenuation in chicken cholera, swine fever, and anthrax.

(*To be continued.*)

THE PREVENTION OF TUBERCULOSIS.

An International Congress on Tuberculosis was recently held in Paris under the presidency of M. Chauveau, at which many important subjects were discussed, including the relation of bovine to human tuberculosis, infection, and communicability in other ways, and the duties of the State in this connection. Before the adjournment, the President put to the vote the following propositions, which were adopted as the sense of the Congress concerning the questions submitted for its discussion: (1) Boards of Health should be empowered to investigate all cases of disease in animals, those which are known to be transmissible to man as well as those which are not yet recognised as of this nature. (2) The Congress expresses its gratitude for the decree which has just been signed by the President of France, placing bovine tuberculosis among the contagious diseases. (3) The seizure and destruction of all tuberculous animals, whatever may be their appearance of health, should be a constant practice. (4) The conclusions of this Congress are applicable to all countries, and should not be considered as referring to France alone. (5) Every effort should be made, by means of circulars, lectures, &c., to warn the laity of the dangers of acquiring tuberculosis by the use of the flesh and milk of diseased animals, and to instruct them as to the best means of avoiding these dangers, and of escaping contagion through various articles used by those sick with pulmonary tuberculosis. (6) Special watchfulness is necessary in the case of dairies, to prevent the contamination of the milk by that coming from a diseased cow. —*Medical Record.*

THE PREVENTION OF TUBERCLE.

The *Lancet* says that:

"The Streets Committee of the Darlington Corporation have resolved to recommend to the Council a periodical inspection of all dairymen's cows within their jurisdiction, with a view to prevent or minimise the spread of tubercular consumption by means of milk from animals suffering from tuberculosis. This decision must be regarded as the outcome of a recognition, which is daily on the increase, of the risk that attaches to the use of milk from cows suffering from tuberculosis, and of the fact that a very large number of cows are affected by this disease. As such we are glad to record the decision come to, for we cannot lay too much

stress on the need which exists for maintaining all our food-supplies under an efficient and systematic supervision. But whilst the danger attaching to milk supplies needs vigilance on the part of sanitary authorities, we trust that, in this matter of phthisis, they will not forget that many other preventable causes are likewise in operation; and that where, as in matters of overcrowding, dampness of houses, and such like, they can effectually intervene, they should be as prompt as in dealing with the milk-sheds. The building of houses on damp soils without a superficial layer of concrete, failure to put proper damp-courses into walls, and the overcrowding and ill-ventilation of factories, workshops, and dwellings—these are all factors in the production of the disease. Attention should also be given to the value as a preventive which is supplied by regular boiling or cooking of all milk used as food."

TYPHOID FEVER IN DOGS.

"Dr. J. R. Roberts, of the Indian Medical Service, has published* an interesting note on the occurrence in dogs of lesions resembling those of enteric fever in the human subject. While stationed at Sialkot during the last cold weather he was led, by the occurrence of a heavy mortality among dogs of European breeds, to make a series of *post-mortem* examinations. In a certain proportion of cases he found the following coincident lesions:—(1) an enlarged, dark-coloured, friable spleen; (2) swollen, inflamed mesenteric glands; (3) large oval ulcers in the ileum; (4) swollen oval patches; (5) points of submucous hæmorrhages; (6) large intestine with submucous hæmorrhages along the crests of the longitudinal rugæ seen in the dog; (7) inflamed vermiform appendix. The animals presenting these lesions had suffered during their illness from continued indisposition, increasing debility, distaste for food, vomiting, and stools which, if passed by a human patient, would be at once pronounced typhoid, though this was by no means invariable as constipation might be present. The temperature might be high—in one case it was 104·5°—but temperature in dogs, though normally about 100°, can easily be raised to 103° or higher by exercise. About four years ago Mr. Bland Sutton communicated to the Pathological Society of London† a paper on the occurrence of a disease in monkeys and in beavers which he identified with the typhoid fever of man;

* *Indian Medical Gazette*, June, 1889.

† *Transactions*, vol. xxxvi, p. 528; and *Journal*, vol. i, 1885, p. 944.

he also observed the lesions in a tiger in a solitary case. The only symptoms observed during life were diarrhœa and hæmorrhage, but it was not possible to make careful clinical observations. He pointed out that M. Serres had recorded the occurrence of typhoid fever in monkeys, dogs, and cats, and had made some extended observations during an epidemic which occurred among the monkeys in the Musée d'Histoire Naturelle in Paris; the symptoms observed were diarrhœa, increased frequency of pulse and fever, ending almost always in death. Dr. Roberts suggests that if further examination should prove that dogs, as he suspects, are liable to typhoid fever, that fact would help to explain the continued prevalence of the disease in Indian cantonments in spite of the sanitary precautions taken."—*British Medical Journal.*

DIAGNOSIS OF HENDON DISEASE (COW-SCARLATINA) FROM OTHER DISEASES OF MILCH COWS, CHARACTERISED BY SORES ON THEIR TEATS.

By E. KLEIN, M.D., F.R.S.*

On a number of occasions since the publication of Mr. Power's report on scarlatina at Hendon, demands have been made for a categorical and final statement of the characters differentiating the Hendon disease from other diseases of cows that show sores on the teats. It will be remembered that Dr. Cameron (in his paper published in the 1885 Report of the Medical Officer, Appendix A, 8 *b*) endeavoured to assist dairymen to understand what appearances on cows' teats ought to be regarded with suspicion. But this paper had, of necessity, to take up the subject very much at the point where it was left by observers at the beginning of the century. Apart from its immediate purpose, it has done very good service by showing the ignorance of the last eighty years as to the nature of sores upon the teats and udders of milch cattle.

Before the time of Jenner, "cow-pox" was the familiar name given to every sort of sore on cows' teats; or the names "chapped teats" or "blister pocks," found some ill-defined place among the names given to such sores. Then came the recognition of a form of sore, denominated variolæ vaccinæ, to which the distinctive name of "true" cow-pox was attached. This is the disease which we call vaccinia, and which we purposely produce by inoculation into human

* Supplement by the Medical Officer to the Seventeenth Annual Report of the Local Government Board. (C—5526. I.) 1888.

subjects for the sake of protecting them against smallpox. The distinction of this particular sore from other forms of cow-pox led to the whole of the remaining forms being called "spurious" cow-pox, and except for Ceely's notable endeavours to obtain better knowledge, "spurious cow-pox," blister pock, and the like vague terms have continued to be used indifferently for all sores on teats and udders that were not "true cow-pox."

So the matter stood until at a Hendon farm a second definite member of this group of diseases was recognised by Mr. Power. The existence of a specific ailment in cows related to scarlatina in man had for some years been suspected; in several instances, the facts of scarlatina-milk outbreaks having seemed to find their best explanation in such a hypothetical disease,* but at Hendon a clearer recognition of it was effected by a train of events connecting scarlatina, not only with milk, but with the milk furnished by particular milch cows which on examination were found to have a special form of eruption on their teats.

In view of this second differentiation of a definite disease from among the mass of cow diseases that show sores on the teats, the old division into true and spurious cow-pox has become manifestly insufficient. It is seen that the name "spurious cow-pock" has in all probability been used to cover a variety of sores, having essential differences in nature, just as until the time of Jenner the name "cow-pock" had covered along with various other things the disease which we know as vaccinia.

But it is one thing to have learnt the essential nature of those sores in the cow that are concerned with vaccinia or scarlatina in the human subject; and another thing to affirm the distinguishing characters by which those sores may be recognised from other sores that once on a time laid claim to being equally with them, "cow-pox" or "spurious cow-pox." Our new discontent with the name "spurious cow-pox" does not at once give us a knowledge of the nature of those sores which remain on the list; and we are now learning that there are many different kinds of such sores.

Perfectly familiar as agriculturists are with sores on the teats of cows, none of them have professed to say (until perhaps recently) that "true cow-pock" or vaccinia as above defined is a disease that frequently comes under their observation. When, in 1880, there was a question of establishing an animal vaccine station for the Board's pur-

* Report of Medical Officer, Local Government Board, for 1882, pp. 63—71.

poses, and of beginning the series of calf vaccinations from a case of "true cow-pox" of spontaneous origin, no such case could be heard of in England, although the Agricultural Department of the Privy Council afforded all the help they could to the discovery of one,* and it was necessary to resort in March, 1882, to a foreign country for lymph from a spontaneous case.

So with the Hendon disease; perfectly familiar as agriculturists are with spurious cow-pox, they would not, I suppose, contend that the disease identified at Hendon is one of every-day occurrence. At least they could only contend this if they set out with the obvious *petitio principii* that it was common because cow-poxes were common and that this is a cow-pox.

(The bulk of the sores in cows' teats, no doubt, that come under the agriculturists' observation are not, as we see them, capable of producing either vaccinia or scarlatina; and the differentiation at present demanded is between those which are and those which are not thus capable. I purposely, it will be observed, set aside questions of primary origin, which would be as much out of place here as would be speculations on a common ancestry of measles and small-pox.)

Those, therefore, who cry aloud for means of diagnosis between the Hendon cow disease and other diseases which are characterised by sores on cows' teats, have no right to expect that the new demonstration of the essential nature of Hendon disease shall be at the instant accompanied by demonstration of the ocular distinctions between it and other diseases causing sore teats; that what has been overlooked for eighty years shall suddenly be exhibited in a description or a picture so that he who runs may read and never make a mistake afterwards.

The Hendon disease, having been only lately indentified, the opportunities for studying it differentially, even in pathological aspects, have necessarily not been abundant; while still less frequent have been the opportunities for observing the clinical manifestations of the disease spontaneously occurring.

But during the past year, and since attention has been

* It is pertinent to recall in the present connection that during this search for cases of spontaneous vaccinia in the cow, the Board had the advantage of Mr. Ceely's assistance; that he distinguished at sight the "spurious" nature of a number of cases of sore teats in cows presented as having cow-pock; and that inoculation experiments demonstrated the correctness of his diagnosis.

directed afresh to the subject of cow diseases having sores on the teats for one of their symptoms, specimens of disease have been received from a number of sources, and have been submitted to careful study. On the present occasion I propose to say no more of them as a group than that I perceive in the various specimens, living and dead, a number of characters differing *inter se* in a manner to suggest that several distinct diseases possess this common symptom, and that some of these diseases possess one or another sort of direct concern for mankind. To two of the teat diseases I must, however, refer somewhat at length; to one of them principally for the purpose of guarding those who may take up the pathology of teat diseases against haste in formulating conclusions as to their nature.

The Wiltshire Disease.

In November and December, 1887, a certain ulcerative contagious disease of the teats and udder in cows was observed at a group of separate farms all belonging to the same owner in Wiltshire. The milk of these cows had been distributed without (it was asserted) producing scarlatina in the consumers of the milk.

On December 9th, 1887, Dr. Crookshank wrote to the Principal of the Agricultural Department respecting the nature of this disease, in the following terms: "I have the honour to report to you that there is overwhelming evidence proving that the disease of the teats of the cow which I received instructions from you to investigate is the true Jennerian cow-pox." The following are the terms in which the Principal of the Agricultural Department introduced on the same day this discovery to the Medical Officer of the Local Government Board:—"Dr. Crookshank, who, as you know, has been helping us in the inquiry about the cow disease (Hendon), wrote to me this morning to inform me . . ." The Principal, on being asked to explain the use of the word "Hendon" in this connection, replied, "I used the term Hendon cow-disease suggestively, because I did not see it. What I referred to is the eruptive disease of the teats now prevailing."*

The thesis thus adduced by Professor Crookshank was maintained by him before an extraordinary meeting of the Pathological Society, held on December 15th, 1887. I had

* The medical officer allows me to quote these letters, as having historical significance. I may add that comparison of dates shows that Professor Crookshank could not have entered on his inquiries before the middle of November.

by that time had opportunity for examining the *post-mortem* appearances of one of the cows brought from Wiltshire. Professors Crookshank, Brown, and Axe were present at the *post-mortem* on November 29th, and to them I demonstrated what I regarded as being important pathological differences between the visceral lesions observed in the animal (cow No. 1) from Wiltshire, and those observed in the Hendon animals. What Professor Crookshank's paper recorded for the instruction of the Pathological Society on December 15th, concerning the appearances that had been seen by him, was as follows:—"In deference to Dr. Klein's wishes the cow was conveyed to the Brown Institution, on the condition that due notice was given to enable us to be present at the necropsy." Dr. Crookshank's paper* said no more than this; not a word of the pathological appearances seen by him on November 29th. But in reply to comments made in the meeting upon his paper, taunting him with maintaining the identity of two diseases, one of which he had never seen, and the other of which he did not know by its *post-mortem* appearances, he explained that he "was present at the *post-mortem* on one (of the cows from Wiltshire), and he frankly admitted that the appearances which Dr. Klein stated that he had found in the two Hendon cows which he examined were not present. He thought it was very probable that in a calf (it was one inoculated from a Wiltshire case) that he had now under his observation at the Royal Veterinary College, these *post-mortem* appearances would be found."†

Of course the failure of Dr. Crookshank's evidence to show an identity of this Wiltshire disease with the disease at Hendon constitutes no proof of the contrary proposition. I do not think, however, there can be any question that the disease seen in Wiltshire, whether it were cow-pox or not, is not the disease which I saw at Hendon, and now known as cow-scarlatina. Inasmuch as both are ulcerative diseases, showing their ulcers particularly on teats and udders, the two no doubt resemble each other. In so far as the ulcers have the structure of ulcers,‡ the

* See in journals of December 17th, 1887, *British Medical Journal*, p. 1318, and *Lancet*, p. 1210.

† *British Medical Journal*, December 24th, 1887, p. 1383.

‡ Any similarities found under the circumstances between the two kinds of ulcers would be common to other kinds of ulceration of the skin of the teats as well, be they cow-pox, or spurious pox, or other kinds. That the similarity in the microscopical appearances of sections of the ulcers on the teats of the Wiltshire cows and Hendon cows to cow-pox "vividly recall the condition observed in sheep-pock or cow-pox" does

ulcers (if we may ignore considerations of duration) again have resemblances *inter se*. In so far as they are communicable from animal to animal, they are both of them infectious diseases. Also they both have micrococci in the discharges of the ulcers, though the micrococci differ in their characters. But there, it seems to me, the similarity ends. Putting aside, as beyond my immediate province, the evidence derivable from differing behaviour of the milk at Hendon and in Wiltshire towards consumers, the constitutional malady found in the Hendon cows, and transmissible to calves by inoculation, is characterised by an aggregate of symptoms and *post-mortem* appearances that find no parallel in the Wiltshire disease.

This aggregate of *post-mortem* appearances in cow-scarlatina (found in each of seventeen animals, viz. in two cows examined in 1885, in eight calves examined in 1886, and in six cows and one calf examined in 1887) would seem as constant and uniform as considerations of age, of animal development, of stage and intensity of disease allow us to expect. But in the examinations of animals suffering under the Wiltshire eruption there are no such appearances. Indeed, unless there exist some other disease incidentally complicating the case, the eruption of the Wiltshire cows would appear to be unaccompanied by any visceral lesion whatever.

A provisional conclusion to this effect is nowise disturbed by the observations reported to the Pathological Society in January of the present year. At this later meeting of this Society (January 17th) Dr. Crookshank found occasion to describe the *post-mortem* appearances

not make the Wiltshire or Hendon disease sheep-pock or cow-pock, is a point which I need hardly insist on; anyone who will take the trouble of looking through the illustrations of any good text-book on pathology, will find plentiful instances of skin ulcerations, in which the microscopic appearances are extremely similar. Take, for instance, Ziegler's 'Pathology' (translated and edited by Dr. D. MacAlister), part ii, pp. 156, 157, 158, 159, 160, 161, 162, and following, where the reader will find figured and described numbers of instances of skin diseases very similar to one another, and to the ulcerations and skin eruption that we are now dealing with. Or, turning to syphilitic papules, or to cutaneous papules due to other causes, he will find the same similarity. But this would not make them identical. When examining a section through a syphilitic papule no one would make a diagnosis of syphilis from it; he would of course take into account the history, the time of development and duration, and various other conditions. Again, anyone comparing a section through the skin of a blister from a burn (Ziegler, ii, fig. 149, p. 160) with one of a smallpox vesicle (*ibidem*, fig. 148, p. 158) will understand the point, and looking at the microscopic appearances of sections through the skin in the various forms of eczema, will find ample illustrations of this.

which he, with Professors Brown and Axe, had witnessed on November 29th in the cow from Wiltshire examined *post mortem* at the Brown Institution; and he says of this cow (in his paper published in the *British Medical Journal* of January 21st, 1888, p. 126), "Inasmuch as there was no suspicion of any disease, complicating the eruptive disease of the teats, it was not surprising to find that naked-eye appearances at the *post-mortem* examination were practically negative. All that could be noted of the viscera was as follows:—Petechiæ on the spleen; liver, a few whitish irregular spots; fatty patches on surface of the cortex of the kidney." Hereon I have to observe that these statements are incorrect in several notable points. In the first place the animal had for some days a markedly high temperature, therefore of such an animal it cannot be said that there was no suspicion of any disease complicating the eruptive disease of the teats; secondly, the animal had a large firm tumour* in the udder (suppurative mastitis), which was diagnosed during life; thirdly there were no petechiæ on the spleen; and fourthly, there were no fatty patches on the surface of the kidney, but white patches penetrating into the tissues of the cortex, as an incision into its substance showed.

Then Dr. Crookshank went on to say, concerning this same cow (p. 126):—"Inasmuch as sections of the kidney of cow No. 1 (Wiltshire) showed similar appearance to those in sections of Dr. Klein's Hendon cow No. 4, the appearances in the latter can hardly be regarded as a necessary indication of the disease being scarlatina in the cow."

Now, the examination of this kidney undoubtedly showed inflammatory changes, and so far its condition was comparable with what is habitually seen in animals affected by the Hendon disease. But in this kidney there was more than this common condition; there was found in it, on microscopical examination, not only a common glomerulo-nephritis, but also numerous collections of round-cells arranged throughout the tissues of the cortex after the fashion of commencing miliary abscesses. This appearance it was that gave rise to the white patches penetrating into the tissues of the cortex, an appearance I have never seen in the kidney of Hendon disease. I showed this appearance to those present at the *post-mortem*. I connected it with the udder abscess, and I have pointed out to the Pathological

* Mentioned by Dr. Crookshank in sequel to the before-quoted passage; but mentioned only to be dismissed without comment (*British Medical Journal*, loc. cit.).

Society that the total appearances were consistent with metastatic pyæmic infection, and I further stated that, having regard to the symptoms and the state of the affected quarter, such a pyæmic infection was the most probable explanation of the case.

Abscess of the udder, whether or not thus complicated, forms no essential part of the Wiltshire eruptive disease; and it is obvious that the question of there being any morbid appearance of the viscera, pertaining to the Wiltshire disease as such, could only be entertained after such incidental conditions had been considered and set aside.

Of the case of the calf described by Dr. Crookshank in the same paper as having been inoculated from the above-mentioned Wiltshire cow, we are told that, during the second week after inoculation, it was very dull, and did not feed well. It had diarrhœa for several days, and passed bloody urine. It was noticed that it had a slight cough, which got worse. The place of inoculation was suppurating freely, and there was considerable inflammatory thickening around the seat of inoculation. The animal was killed thirty-six days after inoculation. The *post-mortem* appearances described by Dr. Crookshank showed that the calf had been affected with severe pleuro-pneumonia. It was, I hold, the acute specific disease known as the "pleuro-pneumonia of cattle," the appearances being quite those of this disease. As was to be expected, many of the viscera of this calf were found in a state of acute inflammation; but for the rest there was no resemblance between the pathological appearances in this calf and in the calves described at pp. 381—382 of my 1886 report, with which Dr. Crookshank would compare them. I shall not argue this point, but will leave it to the judgment of any competent pathologist who cares to read critically the accounts given of the several *post-mortem* examinations.

Again, it seems to me plain that in the case of this calf it was necessary to deny a connection between each observed *post-mortem* appearance and the primary pleuro-pneumonia (perhaps also to deny a relation between it and the inflammatory process going on round the place of inoculation) before a notion of relation between the *post-mortem* appearance and the teat disease, as such, could be sustained. And assuredly there exist no grounds for any such denial.

In the third animal reported on by Dr. Crookshank at the January meeting of the Pathological Society, a cow (No. 2) from Wiltshire, having an abscess in the hind quarter of its udder, with a crusted sore at the apex of a swollen

teat, Dr. Crookshank found no visceral lesions whatever (*British Medical Journal*, loc. cit.). And I myself, on *post-mortems* of calves in which the Wiltshire eruption had been artificially induced, have also observed no visceral disease.

In brief, as between the Hendon and the Wiltshire diseases the diagnostic value of *post-mortem* appearances may be stated as follows:

(1) Absence of visceral lesion negatives, according to our present experience, a diagnosis of Hendon disease or cow-scarlatina, but is compatible with Wiltshire teat eruption.

(2) Such aggregate of inflammatory changes in the viscera, as has been found and described as occurring in Hendon disease and in animals inoculated with human scarlatina, is sufficiently constant and special to allow the diagnosis of cow-scarlatina to be made from these changes; and

(3) Though it seems superfluous to formulate the proposition, the presence of inflammatory lesions in one and another organ is compatible with Hendon disease on the one hand, and on the other hand with a variety of constitutional affections occurring during the course of the Wiltshire eruptions.

I shall be expected to say something of the means of diagnosing the Hendon disease from the particular disease thus presented to us from Wiltshire; and in doing my best to answer this explanation, I would first recall the consideration advanced in a previous page, that conclusive results for the service of the clinical observer should not yet be expected from the pathologist. It is his concern, in the first instance, to establish, by the use of his own methods, the natural history of each several disease-process which may be accompanied by sore teats as a symptom. In the study of the Wiltshire disease proper I have already made some progress, but hardly sufficient to warrant an attempt to diagnose it, as seen during life, from other teat diseases. So, referring my reader to a subsequent paper for what I have learned respecting the organisms present in this disease, and reserving further observations on its pathology till my study of it has made more progress, I note the following points as regards the symptoms of the Hendon and Wiltshire diseases respectively, presenting them for what they may be worth, and premising that I myself draw no final conclusion from the facts:

The Hendon disease is more commonly than the Wiltshire disease characterised by the loss or loosening of hair in patches.

The teat sores in the Wiltshire disease appear much more flat and superficial than those seen at Hendon.

The teat scabs of the Wiltshire disease, more commonly than those of the Hendon disease, are found adherent to the base of the sore during three or four weeks.

The Wiltshire disease is much more readily transmitted to man in the operations of milking than is the Hendon disease. Indeed, I myself know of no instance where the Hendon disease (that which produced scarlatina in human consumers of milk) has been transmitted by inoculation to the human subject.

The other teat disease to which I have adverted as having, in common with the Hendon disease, sores on the teats for one of its prominent symptoms, is one that I have had occasion to investigate for the first time during the year 1887. The disease was found in cows at Edinburgh, and the consumers of their milk had suffered from an illness which was characterised by fever and sore-throat, but apparently did not bear other resemblance to scarlatina or diphtheria. Of the diagnosis of the sores of this disease from those seen in Hendon cows, I shall have to speak at length in another report which deals with this Edinburgh disease.*

These are the only sore-teat diseases with which the present report will be concerned. The characters separating the Hendon disease from cow-pox and from other complaints having sore-teats for a common symptom, are now being made a subject of study.—*Practitioner.*

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

MONTHLY COUNCIL, Wednesday, July 31st, 1889.
LORD MORETON, President, in the chair.

VETERINARY COMMITTEE.

Sir John Thorold (Chairman) stated that Professor Brown had presented his monthly report and also the quarterly report of the Royal Veterinary College. The Committee recommended that both reports be published with the proceedings of Council.

The Committee has given careful consideration to the suggestion made by Ellis and Mr. Duckham at the general meeting in the showyard at Windsor and referred to them by the Council, viz.:

"That the Council should urge the Government to extend

* See report on the pathology of a disease in the cow observed at Edinburgh, in the annual report of the Medical Officer of the Local Government Board for 1887 (published 1888), pp. 220—229.

the prohibition of the admission of live cattle into this country from Holland until such time as there is no foot-and-mouth disease in Germany."

They recommend the following reply for adoption by the Council:

"As it appears that, since the date of this Society's representation to the Government on the subject, no outbreak of foot-and-mouth disease has been reported from Holland, notwithstanding the continued existence of that disease in both Germany and Belgium, the Council consider that having regard to the terms of their resolution of April 16th, they would not be justified in making any further application to the Privy Council with reference to a matter in which the Government are solely responsible."

Professor Brown's new pamphlet on 'The Animals of the Farm in Health and Disease,' was now in the press, and would be published almost immediately. The Committee had considered a communication which had been received from the competitors in the Horse-shoeing Competition at Windsor, protesting as to the manner in which the competition had been carried out, and recommended that the applicants be informed that their protest cannot be entertained. A report had been received from Mr. Charles Moir, the Society's Provincial Veterinary Surgeon for Glamorganshire, upon the supposed poisoning of sheep from the effects of copper-smoke. This report was ordered to be published with the proceedings of Council.

Professor Axe had brought before the Committee the general question of the improvement of horse-shoeing, and had sketched a scheme for the establishment of an institute for the training of farriers. He suggested that a joint committee of the Royal Agricultural Society, the Royal College of Veterinary Surgeons, and the Farriers' Company, should inquire into the necessity of such an institute, and if thought advisable take steps towards its formation. Professor Axe had undertaken to submit his scheme in writing for the consideration of each member of the Committee, with a view to its formal discussion at the next meeting on November 6th, and also to lay the matter before the Royal College of Veterinary Surgeons.

Professor Brown's Report on Contagious Disease of Animals.

Pleuro-pneumonia.—Between May 25th and July 20th, a period of eight weeks, 116 fresh outbreaks of this disease were reported in Great Britain, 55 of them in England and 61 in Scotland. This is a considerable increase as compared with the preceding few weeks, when the outbreaks were about seven a week. Not only has there been this increase in the number of outbreaks, but the area over which the disease was distributed has been considerably extended, fresh centres having recently been reported in the counties of Chester, Leicester, and Northampton, districts formerly free from this disease. In England,

the counties of Essex, Lancaster, London, Middlesex, and York (West Riding), have suffered most; while in Scotland, Edinburgh and Fife have had the greatest number of outbreaks. The total number of cattle attacked during the eight weeks was 368, and there were, besides, 1535 healthy cattle slaughtered which had been exposed to infection. In Ireland, 15 fresh outbreaks were reported; 23 cattle were attacked, and 137 healthy cattle in contact with the disease were slaughtered.

Anthrax.—This disease has been less prevalent during the past few weeks than it was earlier in the year. Only 15 fresh outbreaks have been reported in Great Britain in the eight weeks, and 26 animals were attacked.

Swine Fever.—This disease has lately been increasing; 1045 fresh outbreaks have been reported in eight weeks, or about 130 a week. The total number of swine attacked was 5018, of which 2601 were killed and 1862 died.

Quarterly Report of the Royal Veterinary College.

During the last quarter cases of various diseases of cattle, sheep, and swine have been received at the College, and it is a satisfactory outcome of the attempt which is being made to advance the practice of veterinary medicine in relation to animals of the farm that at one time the accommodation which is at present available for those animals was overtaxed.

The diseases which have been under observation at the College are abortion in cows, arsenical poisoning from the use of a fluid sold as tobacco water for destroying vermin on the skin, anthrax in cattle, a fatal disease in sheep resembling braxy, a fatal form of skin disease among sheep, a peculiar disease affecting the legs and feet of sheep, tuberculosis in cattle, sheep, swine, and poultry, blackleg in young cattle, actinomycosis in cattle, diarrhœa in lambs from the presence of tapeworms, lung-worms in calves and sheep, and swine fever. In compliance with the requests of members of the Society, inquiries have been made by the officers of the College in reference to outbreaks of disease in different parts of the country. The following reports will indicate the character and results of the investigations:

Abortion among Cows.—On the 12th of April an inquiry was instituted into the circumstances relating to the long-continued prevalence of abortion in a herd of milch cows. The farm where the disease appeared comprises 327 acres, of which one third is arable and two thirds grass. The latter is mostly old pasture, but a small quantity has been recently laid down. The farm was entered upon at Lady Day, 1885. The former tenant kept about sixteen head of breeding stock, but during his occupation, extending over ten years, abortion was only occasionally known to occur upon it.

The soil varies in character in different parts of the farm from a strong clay to sandy loam. All is drained, and the pasture land is sound and fairly good in quality. The general surface of

the farm is flat, but the drains have plenty of fall and maintain a fairly dry lair.

The general health of the herd has been good, and the cows have yielded a fair supply of milk, with an average percentage of butter. With respect to the mortality, it was ascertained that in 1885 two cows were destroyed on account of tuberculosis; in 1886 there were no deaths; in 1887 one cow died from milk fever; and in 1888 two others succumbed to the same malady, and one was destroyed on account of disease resulting from retention of the afterbirth.

The herd is made up of shorthorns and Jerseys. The stock is mostly home-bred. Occasionally one or two have been bought when, in consequence of abortion, the milk supply has fallen short of the requirements of the dairy.

Since 1885 ten bulls have been at service in the herd. Some were shorthorns, others Jerseys. Abortion has not been confined to cows served by any particular animal, nor has it occurred with greater frequency in cows served by one bull over those of another.

Inquiry as to the fertility of the herd brought out a striking coincidence in the prevalence of abortion and misconception during 1887 and 1888. In this connection it appears that in 1885 no cows returned to the bull after service. In 1886 three were unfruitful, but in 1887 no less than nine came back, and in 1888 eleven. Of the twenty-three animals here referred to it is important to note that nineteen were heifers.

It will thus be seen that abortion and infertility were coexistent, a fact which needs to be borne in mind in all future inquiries with a view to determine their casual relations.

The system of feeding and general management is much the same as that in other dairy herds. In summer the cows are at pasture both night and day, and are brought into the sheds morning and evening to be milked. Here the water supply is derived from ponds fed in some instances by springs, in others by surface drainage. There did not appear to be any reason to question its fitness for drinking purposes.

About the middle of October the cows are housed for the winter, daily exercise being allowed when the weather is fine.

The food is made up of hay or straw chaff, two or three pounds of decorticated cotton and pure linseed cake, and four to six pounds of mixed meal. Long ensilage and swedes are added to the food at Christmas, and in March mangolds are replaced by swedes. All the food ingredients are said to have been of good quality and free from any obvious contamination with unwholesome matter.

On inquiry as to the use of ensilage, it was found that in 1887 and 1888 this had been given to the milch cows only. As, therefore, the malady had largely prevailed among the heifers during this time, the ensilage may be fairly dismissed from consideration as having any concern with the disorder.

It was also noticed that although cake had not been used during the present year, no less than four cases had occurred up to the time of the inspection (April 12th), thus excluding this ingredient of the food also from the possible causes of the mishap.

From time to time during the prevalence of the disease search has been made for ergot, without, however, leading to its detection in any of the pastures, and the fullest consideration of all the facts and circumstances of the inquiry fails to supply a reasonable explanation of the origin of this troublesome pest.

Arsenical Poisoning.—In May an inquiry was made into a fatal disease which occurred in a number of young cattle near St. Neots.

It appears that a number of the herd having been noticed to be infected with lice, thirty-three of them were dressed with a liquid purchased from a neighbouring chemist as "tobacco water." A short time after the application had been made one of the beasts showed signs of ill-health, several others sickened on the following day, and in a day or two all of them had become more or less affected. Of the thirty-three animals dressed nine died in the greatest of agony, exhibiting all the symptoms of arsenical poisoning.

The parts to which the dressing was applied, and especially in the region of the neck, were much swollen, and in some instances the skin was completely destroyed and in a sloughing condition. Dulness, diarrhœa, great thirst, staggering gait, and acute abdominal pain were the leading symptoms of the disorder. *Post-mortem* examination showed the stomachs and intestines to be intensely inflamed, and chemical analysis of their contents revealed the presence of arsenic. The so-called tobacco water was also analysed and found to contain arsenic in large amount.

Anthrax.—An investigation has been made as to fatalities alleged to be due to anthrax in Northamptonshire. The circumstances leading to the inquiry were the deaths since July, 1887, in three adjacent meadows on an estate of fourteen beasts, and of one which was being fed on hay grown in these meadows.

No evidence of a case of anthrax prior to July, 1887, could be found. Workmen who had been connected with stock on the estate for very many years had no recollection of any sudden deaths on these fields.

The pasture had not been broken within the memory of man, and with exception of the draining of one no material change had been made. Other parts of the estate appear free from anthrax.

It was observed that carcases of affected animals had been buried in the meadows and the adjoining spinneys, and that cattle were grazing about the graves.

Several sudden deaths among sheep have been reported, but those which were submitted for *post-mortem* examination yielded no proof of anthrax.

Careful inquiry failed to indicate the source or mode of distribution of the anthrax germs.

As the meadows were full of grass, which it was essential to eat down, it was deemed advisable to adopt Pasteur's system of protective inoculation against anthrax. This was carried out on twelve beasts which were to graze on the pastures.

Two ricks of hay cut from one of the meadows supplied two calves at Creaton, and one of these calves died of anthrax.

With regard to the disposal of this hay, it was suggested that the safest plan would be to burn it. If the owner should not feel inclined to adopt this course, animals to be fed on the hay might previously be submitted to the preventive inoculation referred to.

Fatal Blood Disease in Sheep.—As opportunity occurs it will be advisable to study the nature of the malady causing sudden death in sheep, which in some of its characters resembles a disease met with commonly in Scotland, and described as "braxy."

A Disease Affecting a Flock of Sheep in Gloucestershire.—Considerable numbers of a large flock of sheep had become affected with swellings of the limbs, at first rendering the skin hot, tense, and painful, as manifested by intense lameness, usually terminating in death and ulceration of large patches. Spontaneous recovery is not uncommon, and the condition is not often fatal. Frequently after healing is complete there remains a much thickened limb, which depreciates the value at sale for breeding purposes. During the progress of the malady the sheep suffers much pain and loses flesh. Medical treatment favours recovery.

The nature of this disease is obscure, and requires further study. The owner of the flock in question offers facilities for further investigation, which it is proposed to prosecute.

Suppurative Disease of the Face in Calves.—In November last a disease of a fatal character broke out in a number of calves belonging to a farmer in Essex.

The malady was confined to animals between one and three weeks old. In all twenty were affected, and ten or twelve succumbed to the disorder.

At the time of the occurrence some of the calves were being fed on linseed-cake gruel, and others were taking milk from the cows.

In the majority of cases the disease was ushered in by diarrhœa, which continued more or less severe throughout the attack. This was shortly followed by a hard inflammatory swelling on one or both sides of the face, which ultimately broke out, and discharged a quantity of thick pus, as well as a tough mass of dead tissue, or "core."

A copious outflow of "matter" continued for two or three weeks after the rupture of the abscess, leading to great emaciation and weakness, and in the majority of cases to fatal prostration.

No *post-mortem* examinations appear to have been made, and at the time of the inspection the disease had disappeared, save in

one instance, where a slight tumour still remained on the face. This animal has been secured, and will be the subject of further inquiry into the nature of the affection.

Of the origin of the disease there did not appear to be any satisfactory explanation forthcoming, but inquiry brought to light the fact that all the calves affected were by one bull, and that for some time he had suffered from a discharge from the urethra.

More recently he was destroyed, and from the condition of the lungs, as described by the owner, there is every reason to think he was the subject of advanced pulmonary tuberculosis.

Symptomatic Anthrax.—On the same farm an outbreak of symptomatic anthrax occurred in a herd of thirty-six heifers and steers, varying from six months to three years old. The disease commenced on July 12th, and by the 18th, when the inspection was made, six animals had already died.

The first animal attacked was destroyed early in the course of the disease, when it was thought to have been struck by lightning, and the blood was allowed to remain exposed in an adjoining pasture, but whether this in any way added to the extension of the malady it is difficult to say.

The affection had not previously been known to prevail on the place, and no recent addition had been made to the herd.

At the time of the outbreak the beasts were pastured on land adjoining the River Stort, from which they received their supply of water. The pastures are low-lying, and exposed to occasional flooding.

In the spring of the present year they were, for the first time during the present occupation, dressed with London manure, but in other respects nothing exceptional had occurred in their management.

Notwithstanding a careful inquiry into all the circumstances of the disease, no clue was obtained as to the source of the contagion.

Such measures of prevention as the nature of the case demanded were suggested, and material was procured from recently dead animals to carry on the experiments now being conducted at the Royal Veterinary College.

The expenses attending these inquiries were defrayed out of the annual grant made to the Royal Veterinary College.

The experiments which have been carried on for the purpose of ascertaining the best means of protecting cattle from blackleg are not yet sufficiently advanced to justify any positive conclusion ; but the results which have been obtained have an important bearing on the question of protective inoculation.

G. T. Brown.

On the motion for the adoption of the report of the Veterinary Committee, *Mr. Bowen-Jones* strongly objected to the recommendation with reference to the admission of live cattle into this country from Holland. He moved as an amendment:

"That the Council object to the introduction of live cattle from Holland into the markets of this country as long as foot-and-mouth disease exists in Germany and Belgium."

Sir John Thorold said that before that motion was discussed he would read the following resolution which the Council passed at its special meeting held on April 16th last, and forwarded to the Prime Minister and the Privy Council Office:

"That the Royal Agricultural Society desires to impress upon the Government the necessity of postponing the operation of the Order to admit animals free from Holland from June 1st to September 1st. This would have the double advantage of ascertaining by experience whether the regulations in force in Holland are as effectual as they have been in keeping out disease in face of the serious outbreak of foot-and-mouth disease which has occurred in Europe since the Order was passed; and would also postpone the operation of the Order till after the show at Windsor, thereby tending to allay any anxiety which might be felt by those who are intending to exhibit on that occasion."

Mr. Bowen-Jones said that the two months' subsequent experience was not satisfactory to him, and he did not believe it would be satisfactory to the breeders of stock in this country.

Sir Nigel Kingscote said their resolution only went as far as Holland. They were informed that there had been no fear of foot-and-mouth disease in Holland since. Therefore, if the disease still existed in Germany and Belgium, Holland had kept it out, and they had no right to ask the Government to take action. At the same time, the proposed resolution of the Veterinary Committee would impose the whole responsibility upon the Government, and leave them to watch Holland. They would stultify themselves if they passed Mr. Bowen-Jones's amendment. Holland had done all that had been asked for in their resolution passed last April.

Mr. Allender said Holland was prepared to flood this country with Dutch cattle the very moment the restriction was withdrawn. Holland and Belgium were very nearly one country; the Dutch cattle exhibited at Paris came from Antwerp. He thought they should do all they possibly could to postpone the admission of Dutch cattle into this country.

Sir John Thorold said the matter had been referred to the Veterinary Committee by the Council, and the Committee felt they were bound by the Council's resolution of April 16th. He believed it had been pointed out by Professor Brown that, as the law stands, if Holland took all the precautions required by the Privy Council, that country must be allowed to send in its cattle. The word in the Act relating to the subject was "shall."

The *Earl of Feversham*, in seconding Mr. Bowen-Jones's motion, believed there was no actual disease in Holland when they made the representation. Their action was only in consequence of the danger of its being introduced into Holland

from Germany or Belgium. The disease still existed in Germany or Belgium, and the same reason seemed to him to hold good for asking for a further postponement of the Order as for saying nothing about it and leaving the entire responsibility to the Government.

Mr. A. J. Smith, as a member of the Veterinary Committee, stated that he was in the minority at the meeting of the Committee on the previous day. He was strongly in favour of the continuance of the prohibition.

Sir Nigel Kingscote said no one felt more strongly than he did upon this question. He had done his best to try to keep the disease out by supporting the restriction of the importation of cattle from foreign countries. But they had asked the Government to keep out Dutch cattle for a further period, to see if the Netherlands regulations were successful in keeping the disease out of that country. The Dutch Government seemed to have done that, and the Council would stultify themselves if they passed any other resolution than that of yesterday, which left the whole onus of responsibility upon the Government. He did not see how they as a society could take any other course than that suggested by the Veterinary Committee.

Mr. Bowen-Jones said that whilst the insidious disease of foot-and-mouth existed along the long land frontier of the Netherlands it was perfectly easy for it to be conveyed over the border, and then into this country. If they had another outbreak of foot-and-mouth disease, British agriculture would then be thrown back for a great number of years. He emphatically protested against allowing the Netherlands cattle to come over alive and be distributed through the markets of the country.

Viscount Emlyn thought that whatever action they took they should ask for something that was practicable and that could be carried out by the Government. So far as he was informed, they could not in the present state of the law prevent the importation of Dutch cattle if Holland went on showing a clean bill of health and complied with all the restrictions required of them.

Mr. Bowen-Jones replied that if the legislation that at present existed would not admit of the Government preventing the landing of cattle from the Netherlands, a Bill of one clause would do so. They, as agriculturists, should look after their own interests, and safeguard them as much as they could. He was satisfied that no practical man in this country believed that they were safe from the disease if cattle from the Netherlands were brought over when the disease existed just across the border.

Sir Nigel Kingscote said that the Act of Parliament of 1878 stated that the Privy Council "shall" allow cattle to be transmitted from foreign countries when they have a clean bill of health. He knew, and everybody knew, that they could not bring in an Act of Parliament in a minute. If they passed such a resolution as was proposed by Mr. Bowen-Jones they would be weakening their authority. Professor Brown would

doubtless tell them that the Government could not keep out the cattle.

Professor Brown stated that it was a purely legal question, and he thought his best course would be to tell them what the legal construction which had been placed before the Committee of Agriculture amounted to. It amounted to this, that as the Act of 1878 now stood, if a certain country satisfied the Privy Council that their laws in regard to the importation of animals from other countries and the general measures which they took for the prevention and introduction and spreading of disease, and the sanitary condition of their stock were satisfactory, they then had a right of entry, or, as the Act runs:—"The Privy Council shall allow those animals to be landed without being subject to slaughter or quarantine." And he distinctly recollected the Duke of Richmond in that room saying that the Lords of the Committee on Agriculture, of which he was one, having carefully considered the whole subject, were reluctantly compelled to admit that they were unable to keep the animals from Holland out. There was no legal point of which they could take advantage to enable them to exclude Dutch cattle from this country. Holland had done all that was required by the Act.

After some further discussion, the Chairman put the amendment, for which there appeared seven for and twelve against. The amendment having therefore been lost, the report of the Committee was adopted without alteration.

ROYAL COUNTIES VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at the Crown and Thistle Hotel, Abingdon, on Friday, the 26th of July last, G. A. Drewe, Esq., President of the Association, in the chair. There were also nineteen members and three visitors present. Messrs. A. L. Butters, Paddington; J. Sutcliffe Hurndall, Blackheath; G. Rees, Staines; and W. Western, Bracknell, were unanimously elected members of the Association.

A communication was read from Mr. Dudgeon, Hon. Sec., North of England Veterinary Medical Association, calling attention to the fact that the meetings of that and the Royal Counties Association clashed, and stating that they would be willing to alter the date of their November meeting if the Royal Counties would alter the date of their February meeting. During the discussion of this subject, which was favorably received, it was stated that a number of associations had no fixed dates for holding their meetings.

Sir H. Simpson proposed that further consideration be posponed till next meeting, and that the Secretary be requested to communicate with the secretaries of different associations in order to

arrange a conference to determine whether it is not possible to have dates fixed by mutual consent for the meetings of the associations.

Mr. Barford seconded this motion, which was unanimously agreed to.

Mr. Simpson (Maidenhead) moved that in the event of a subscription being started for the purpose of placing a bronze bust of the late Professor Robertson in the Council Room of the Royal College of Veterinary Surgeons a sum of not less than £5 be sent from the funds of this Association. This was unanimously agreed to.

Mr. H. J. Wilson (Newbury) submitted specimens of a diseased liver which weighed nine and a half pounds taken from a Jersey calf, nine weeks old; also a diseased tongue taken from a yearling steer.

Professor Williams said the liver was a very peculiar specimen, and one rarely met with. He believed the disease was caused in young animals by irritation set up by the remains of the umbilical cord. The tongue produced gave evidence of actinomycosis.

It was decided to hold the next meeting in London on the last Friday in November.

Professor Williams gave an able address on "Inflammation as a Reparative Process," which, he said, was a very important one to the profession. It was stated at the national meeting that some men worked with their hands and eyes, and some with a "brass tube and a piece of glass, but although some had never possessed the tube and glass, or in other words a microscope, that instrument was as essential to the veterinary profession as the practitioner who confined his attention to the sick box or phial." He (the speaker) had worked with the brass tube and piece of glass for the last thirty years, and he would endeavour to lay before them some of the results, the observations of himself and of many other workers, as to the changes which took place when an irritant was applied to a part. Broadly, they might define it the nutrition of the part which had been or was being acted upon by an irritant, and he might remind them that if the part were not to inflame when the irritant was applied it would be in a perverted or abnormal condition. The speaker then explained what reparative material was essential for the healing of a wound. As a result of the excitement and fever attending a wound, a large number of white corpuscles were produced by the lymphatic glands, and were formed in increased numbers when the body was under the action of an irritant. Hence this increased activity of the lymphatic system was looked upon as a curative one. Red corpuscles were produced from the white cells by ejection of so-called blood-plates. These blood-plates were colourless, and were about half the size of the red cells, being about 1-8600th part in a horse, and 1-6400th part in a man. When escaped from the vessels they behaved like the white cells, forming lumps of coagula. The plates were very numerous in wasting diseases, as their development into red cells

was arrested through want of strength in the patient. To return to white corpuscles, when an irritant was applied they acquired the power of migration. They wriggled through the wall of the vessel, and collected in great numbers at the seat of the irritation. They only acquired this power on being irritated, and the migration gave rise to new growths and the formation of pus. It was a well-known fact that when a part was irritated the ordinary microbes of the atmosphere commenced to play upon that part. The lower forms of life commenced to play upon any part of the body in which the vitality had been lowered. They were the enemies; the strife went on, and it was a case of the survival of the fittest. Then the white corpuscles escaped through the walls of the vessels, and, as observed by one writer on the subject, a royal battle took place between the two. The white corpuscles were there as the army of defence. A mild irritant increased the power of the white cells to resist intrusion from without, and of destroying disease-germs. If, however, the irritant or the germ appeared in great strength the corpuscles died in defence and carried the irritant generally away, as in pus, abscesses, granulations, &c. Without irritation of some kind there could be no healing of wounds, or new tissue-growth. To the observant men it had been a matter of great wonder why certain diseases were so fatal. Take, for instance, inflammation of the bowels in a horse. The animal would die in a few hours. The pain did not do it, for other diseases were as painful. The reason was that in such cases the contents of the bowels were in a state of putrefaction, and the germs, gaining access to circulation, destroyed the vitality of the blood, and death resulted from blood-poisoning more than anything else. That coagulation was also necessary for the process of repair, and blood only coagulated after the irritation and injury of the white corpuscles. Syme, one of the greatest surgeons in Scotland, came to a very practical conclusion upon this point. Syme said that when a part was wounded there was a thin discharge from the wound at first, afterwards it became "glazed." That was simply coagulation, and Syme was of opinion—and he (the speaker) thought his conclusion perfectly correct—that the lips of a wound should not be brought together until this "glazing" had taken place. He would point out that greasy matter prevented this coagulation and process of repair. Coagulation was a proof that the blood was living and was not dead. It was concluded that coagulation resulted from metabolic change in the white cells after irritation; hence, some irritants, by inducing this change, might cause coagulation in the blood-vessels, as in pink-eye and pleuro-pneumonia. The speaker, after recommending soothing agents in acute cases, and irritants in indolent ulcers, went on to observe that the apparently destructive process on articular surfaces of joints was in reality a reparative one, as it removed the barriers to complete repair. Under the influence of slight irritation simple hyperplasia of cellular elements was observed, *i. e.* old cells gave origin to new cells which preserved the character of their progeni-

tors. If the irritation was more intense the old tissue was destroyed and transformed into embryonic tissue. There was then no longer hyperplasia but inflammatory heteroplasia—that was to say, the formation of a tissue which might be foreign to the part, viz. granulation tissue, which was always the same, whether the tissue from which it sprang were skin, bone, synovial membrane, &c. An inflammatory new formation was formed as follows:—Hypertrophy of the cell-nucleus, division of the nucleus, increase and then division of protoplasm, destruction of the fibres or the ground substance, formation of embryonic tissue, formation of new vessels, and cicatrisation. He pointed out that degeneration might occur when the embryonic tissue prolificates with great activity, and cells multiplied and accumulated without simultaneous formation of new blood-vessels. If the formation of the cells was rapid many of them would never be fully developed. That which was done in a hurry was never done well.

The process of granulation was next described by the speaker. In about forty-eight hours after the infliction of an injury, such as a wound, lacerated or divided tissues would be seen in a state of disintegration, and shortly afterwards they began to separate from those which were still living. The most superficial (or in the case of a deeply-seated inflammation, the nearest) capillaries at the same time underwent a remarkable alteration. They were converted into huge sac-like cavities filled to distension with blood. Every small capillary became a prominent object from the excess of blood which it contained, and in a short time became tortuous, and had a tendency to bulge upwards, or rather outwards, on a free surface. In a few days afterwards it would be seen that these same vessels had projected still further outwards, and were recognised as granulation loops. Round about them was a dense layer of white corpuscles, and the whole process seemed to be one of distension and displacement of the capillary vessels in the part. As the vessels were thrown upwards they carried with them a little areolar tissue which became œdematous and constituted the stroma of the granulations. The process by which this growth of new vessels was carried on was as follows:—The capillaries were formed of nucleated and endothelial cells cemented together at their edges. When irritated, these cells swell and soften, and if the inflammation continued their nuclei multiplied and the vessels of the inflamed tissue returned to the embryonic condition, *i. e.* they were formed of embryonic cells arranged in rows and having in their centre a canal through which the blood circulated; and these modified capillaries and small blood-vessels became the point of departure for new vessels in various ways. Sometimes the cells themselves had anastomosing canalicular processes which put them in relation to the old vessels, after which they enlarged so as to receive the blood-corpuscles. In cases—a wounded foot, for example—where there was exuberant granulation, torture was sometimes caused by the application of caustic. That was a mistake; the real remedy was in a soothing application. An

exposed wound would heal without granulation, provided the superficial vessels were kept in their places by accurately applied pressure, and excessive congestion prevented by the wound being kept from putrefaction. In this case the wound became covered with a pellicle of new tissue elements, and the epithelium spread over the surface without there being any more vascularity than was necessary for organisation. Granulations, perhaps at first exuberant, always contracted, and this was not merely a process of drying, but an atrophy brought about by a layer of cicatrix-like elements, mostly spindle-shaped cells. As the stems of the granulations projected towards the surface they had to pierce this layer, which during the process of repair began to contract, and in so doing constricted the capillary stems of the granulations, thus bringing about a natural atrophy. The further development of reparative material was well illustrated by the experimental organisation of porous dead materials, such as a piece of sponge, silk ligatures, dead pieces of tissue (as lung, liver, cornea), balls of worsted, &c. If they took a small piece of sponge, and placed it, with antiseptic precautions, in the peritoneal cavity of an animal, it need not excite general peritonitis. It usually became attached to a coil of intestine within a few days, and in ten days would be found to have become firmly attached to the peritoneal coat of the bowel. If cut into, a layer of organising tissue from one eighth to one tenth of an inch deep would be seen by this time to have penetrated its substance. The manner in which organisation was accomplished was as follows:—The first thing noticed was that the interstices of the sponge became infiltrated with blood-stained fibrinous lymph. The sponge-canals did not usually become obstructed by it, but a fibrinous network was found adhering to their walls with many white blood-cells entangled in it. In course of time, however, this fibrinous deposit gives way to the invasion of cells, both spindle-shaped and round, called by some writers true fibro-blasts. These gradually and progressively pushed their way inwards into the sponge, destroying or supplanting the fibrinous lymph. At the point where the two met the fibrine could be seen falling to pieces, becoming absorbed, and in all probability the new cells lived upon it—in fact ate it up. According to one view, the leucocytes were consumed along with the fibrine, and took no part in the organisation, being suceeeded by larger cells originating in the pre-existing tissue, large and round whilst young, but rapidly tending to become converted into spindles. Other observers and writers, however, thought that the white cells, leucocytes, still played an important part, and that in reality they formed the whole of the reparative process, eating up the débris of the exudation, swelling into large cells, becoming spindle-shaped, and finally formed into tissue. This was not his own opinion. Then came the more practical observation—how were they to guide this process? Were they to encourage it? They would take a case of inflammation of the lungs. There the reparative process of itself, if excessive, might become fatal to life by destroying the vitality of such an organ as the lung.

Hence this irritation, if extreme, proved destructive. In that case they might diminish the irritation, and that was the great object in the treatment of inflammation—to recognise the due amount of the irritation of the body generally, and endeavour to maintain the body in that peculiar condition. If it was extreme the function and vitality of the part were destroyed. They could therefore diminish that risk by reducing the irritation of the part, and confining the reparative process within reasonable limits. Hence their great object should be to recognise the normal state of the body, moderate any undue irritation, and allow the process of repair to go on mildly and naturally. (Applause.)

On the motion of *Sir Henry Simpson* a hearty vote of thanks was given to Professor Williams for his excellent address.

A cordial vote of thanks was also given to the President.

The members and visitors then adjourned for refreshments, and the interesting gathering shortly afterwards terminated.

H. KIDD, *Hon. Sec.*

BORDER COUNTIES VETERINARY MEDICAL SOCIETY.

A GENERAL MEETING of the above Society was held at the Bush Hotel, Carlisle, on 26th July, 1889.

Present :—Jos. Donald, Esq., F.R.C.V.S. (President); Professors McCall, Glasgow; Walley, Edinburgh; Dr. Lamont, Glasgow; Messrs. Robson, Penrith; J. J. Bell, Bell, jun., and Carlisle, of Carlisle; Faulder, Cockermouth; Thompson, Aspatria (Treasurer); Hoadley, Middlesborough; Little, Abbeytown; Croudace, Haltwhistle; Young, Cockermouth; Coates, Brampton; Dawson, Carlisle; Greaves, Manchester; Troughear, High Hesket; Carruthers, Brampton; Steel, Wigton; Armstrong, Penrith (Secretary).

The minutes of the previous meeting were read and confirmed.

Proposed, seconded, and carried, that Mr. Steel, of Wigton, be elected a member of the Society.

Proposed, seconded, and carried, that a new and complete book of rules be printed and circulated amongst the members.

Professor McCall read the following paper on "Tuberculosis, and the Disposal of the Body of its Victims:"

GENTLEMEN,—Having been informed by your Secretary that tuberculosis had not as yet been introduced as a subject of discussion by the members of the Border Counties Veterinary Medical Society, I thought it might be acceptable to you that I should do so. It is a subject in which every individual is deeply interested; and upon how the flesh and milk of tuberculous cattle are dealt with, the health of the community undoubtedly and to a marked extent depends.

The public, by writings and legal prosecutions, have at last been

awakened to the gravity of the position in which they are placed, and they will insist upon a sweeping reform in all that appertains to the inspection of live animals in dairies, and the slaughter and disposal of their bodies, as food for man.

In the work of awakening, I am glad to say that many of the members of the veterinary profession have taken a prominent part, and the same may be said of many of our medical brethren, but in both professions there are a far greater number who have either stood aloof or taken up a position of antagonism. That there should be members of both professions who are not convinced of the evil effects of drinking the milk and eating the flesh of tuberculous animals, in certain conditions, I for one do not feel surprised; and still less do I ascribe their unbelief to a thoughtless ignorance, or a wilful desire to pervert facts!

To those who have not had many opportunities of studying tuberculosis in living animals and making after-death examinations of their bodies, or it may be have not put themselves to the trouble of thinking much about the malady, it is a simple matter to subscribe to the now current views; but to those who have had such opportunities, difficulties arise which they cannot comprehend, nor can they obtain a clear comprehension by a reference to that which has been written on the subject by others.

With the earnest desire to assist others in their difficulties, and in giving expression to them, and to strengthen and correct my own views by the discussion which I hope will follow the reading of this paper, I shall discard all technicalities and treat the subject from what I consider might be called an every-day practitioner's point of view.

As no doubt most of my audience are familiar with the life-history of tuberculosis, I shall only refer in passing to one or two points in connection therewith.

In the year 1865, Villemin made the important announcement that he had, by *inoculation*, transmitted the disease from man to animals, and also from animals to animals, thus proving beyond doubt that tuberculosis was not only an inoculable malady, but a malady transmissible from man to animals, and I need only say that if Villemin had dared he would at the same time have proved by similar experiments its transmission by inoculation from animals to man.

On reading the record of his experiments I remember—and no doubt so do many others—the profound impression they produced on my mind, and from that hour to this I have felt convinced that tuberculosis was an intercommunicable disease, and consequently that the carcases of cattle *markedly affected* with the malady ought not to be used as human food.

Villemin's announcement was made in the same year that "Rinderpest" appeared in this country, viz. 1865, and as during the continuance of that disease I had, in Glasgow, the supervision and inspection of all carcases as to their fitness for human food, ample opportunities were afforded me of studying the various

forms which bovine tuberculosis assumes, and the structural changes which it produces in its course.

It had been the custom in Scotland, as far as known to me, to pass as fit for human food the carcases of all animals affected with tuberculosis, *no matter how markedly so*, if the flesh appeared good, but for reasons which will be referred to hereafter, I felt constrained to adopt a different course, and accordingly condemned them. In July, 1866, in consequence of the condemnation by me of a large fat cow affected with tubercular peritonitis and abscesses in the mesenteric glands, and the refusal of the owner to acquiesce in the decision, legal proceedings were instituted much on the same lines as in the recent prosecution in Glasgow, and with a similar result, viz. condemnation by the Court of the carcass and its confiscation. After this decision the carcases of all animals whose glands testified to the presence of tubercular deposits were confiscated, and this confiscation continued as long as I continued to act as inspector of butchers' meat in the slaughter-houses of Glasgow.

I enter thus fully into these facts because they are not generally known, and because not a few individuals think that the legal proceedings in the recent trial were taken by the authorities of Glasgow without consideration and only on account of the reports which had recently been issued by the Privy Council's Departmental Committee, and by the Paris Congress; and further, I refer thus pointedly because it has been made to appear as if the first proceedings in Scotland, as regards the condemnation of carcases affected with tuberculosis, emanated from Greenock in the year 1874, whereas it was from Glasgow in the year 1866.

But to proceed. In the year 1868, Chauveau, after the performance of a series of most interesting experiments, proclaimed the fact that tuberculosis was not only an inoculable disease as announced by Villemin, but that it also could be induced by *ingestion, i. e.* feeding sound animals on tubercular products. Up till this time it was the almost universal opinion of the profession that the gastric and other secretions were sufficient to destroy all living animal or vegetable organisms or poisons gaining an entrance to the body through the stomach and in the food.

Again, in the year 1881 Toussaint announced an important discovery which he had made, viz., that the organisms of tuberculosis could be cultivated or grown outside of the body of the animal, and following this up in the year 1882, Koch proclaimed that he had succeeded in separating and staining by a special process *the organism* on which the disease depended, viz. the *Bacillus tuberculosis.* Such may be said to be the faintest outline of the history of tuberculosis.

Since the year 1868 to the present time innumerable experiments have been undertaken in all countries to test the accuracy or otherwise of Villemin, Chauveau, Toussaint, and Koch's experiments and conclusions, but in the main they remain unaffected.

While admitting the accuracy and vital importance of the experi-

ments referred to, it would probably not be far short of the truth to say that until lately the bulk of the medical and veterinary professions entertained the opinion that the tuberculosis of the human family and the lower animals were distinct diseases, and therefore not much harm could accrue from using the flesh of tuberculous cattle as food for man.

Much was made and is still attempted to be made of the microscopic differences of human and bovine tubercular eruptions and their bacilli, but while admitting that there are marked differences, yet these differences are clearly of little essential importance, for innumerable experiments have proved that "tuberculous matter derived from man will produce pulmonary phthisis, and this inoculated phthisis can be transmitted by inoculation to other animals." The microscopic differences in the growth of the organism, and the cell structures in which it is embedded or surrounded, probably, as has been suggested, are due to the differences in soil and environments, but, whether or not, the result of experimental proof goes to show that human and bovine tuberculosis are one and the same disease, and that the disease is essentially a parasitic malady.

Vegetable organisms, as is well known to all, will only grow in certain climates at certain altitudes, in other words, they can only live under certain definite conditions, and undoubtedly the organism of tuberculosis may by inoculation be grafted on the body of many warm-blooded animals, but it can only live in a vigorous condition in the bodies of a few.

Those of us who require to make numerous *post-mortem* examinations of the bodies of the lower animals have found tubercular deposits frequently in the bodies of all of them, but unless under direct experimental propagation few of the various species of the lower animals exhibit marked symptoms of the malady during life, and more rarely still do they succumb to the affection.

True it is that tuberculosis is a prevalent and deadly malady in the human subject and also in bovines, but in horses, sheep, pigs, cats, and dogs, it is not so. From what I have observed I incline to the opinion that the *Bacillus tuberculosis* is an organism widespread in nature, that probably it gains an entrance into the bodies of most animals, but that it cannot reproduce itself and produce destructive effects in a perfectly healthy body when introduced by what I would call the natural method of propagation of the malady, viz. inhalation.

It certainly does appear that the human and bovine body furnish the most congenial soil of all animal bodies for this organism to breed in, but the fact that medical men and nurses live in attendance on consumptive patients in consumption hospitals for years and remain unaffected proves that the healthy human body is not a fit soil for the tubercular organism to breed in, even when inhaled for weeks, months, and years.

Should, however, the medical advisers or the nurses contract a chest affection—especially a broncho-pneumonia—then their chances of escape, unless by an early withdrawal, are limited. Experience

would lead me to speak in like terms of the spread of tuberculosis in cattle by inhalation.

Tuberculosis in cattle spreads with greater rapidity in a herd of cattle than it does in a family of individuals, and at first glance it would therefore appear that it was a more infectious malady in cattle than in men, but I apprehend that its rapidity and malignance is more dependent on *ingestion* than *inhalation*, or rather, I should state it, that both methods of propagation are in operation in its spread among cattle. Cattle have no qualms about eating each other's food; in fact, if they get a chance they will, and as *ingestion* is as certain and almost as rapid a method of propagating tuberculosis as *inoculation* we can understand how it is that tuberculosis runs a more rapid course in cattle than in mankind.

It is not necessary that the mucous membrane of the stomach or intestines should be in a diseased state in order to ensure the absorption of the tubercular virus by ingestion, but I incline to the opinion that it may be necessary in order to its reception by inhalation.

In the discharge of my professional duties I have known as many as twelve cows die of tuberculosis within twelve months, and that out of a herd only numbering twenty-four.

As already stated, in our *post-mortem* examinations we frequently find tubercles one or more in number in various organs, and this, too, in all our domestic animals, and from their calcified and other changed conditions it is evident that they have been there for a length of time. Now, leaving out of sight for the present the affection in cattle, and directing our attention to what we have observed in this disease as it affects other animals, it is not only evident that these tubercles were of old standing, but that they never seriously affected either the organs in which they were situated or the general constitution.

The animals were in apparent health and feeding well, it might be up to the day of their death, and it was evident that the cause of death had no connection with the presence of tubercles. There they were, however, and we were forced to admit that to all appearances they had done no harm.

Now, if I am correct in my interpretation, it can only be because the bacilli had died out or been destroyed by leucocytes or other cells or organisms more powerful than themselves. These tubercles, I repeat, we find inhabiting the bodies of all animals, and as it is generally believed that tubercles are an evidence of the pre-existence and operations of tubercular bacilli, then undoubtedly tuberculosis is a widespread malady, but it does not tend to a fatal issue in a large number of the different species of our domesticated animals.

It is a point I wish particularly to emphasise, that while a considerable percentage of most animals show evidences on *post-mortem* of having at some time in their life harboured the *Bacillus tuberculosis*, in most of them, by the death or destruction of the organism, a fatal issue is avoided; and thus it may be said in them to be a

curable disease. Turning now our attention to tuberculosis in the human subject and in cattle, in general terms it may be said that it is in both a fatal malady. Acute or generalised tuberculosis in all animals in my experience has terminated fatally.

Given a case of tubercular pleuritis or tubercular peritonitis, and there can, I believe, be but one termination, and that in death, and probably within six weeks, or at most three months.

But while freely admitting all this, I am of opinion—an opinion founded on the many *post-mortem* examinations I have made—that tuberculosis is a frequently arrested malady in cattle as well as in other animals. Just as in horses and sheep, so in cattle, I have over and over again found a few tubercles in the lungs and liver, some calcified, but many not, the time apparently being too short, and not one speck of diseased structure elsewhere; and such being the case, I entertain the opinion that by a similar process the organisms have been annihilated in the body of the ox, as in that of the horse and other animals, and when such is the condition I am of the decided opinion that the carcases of such cattle are fit for, and should be allowed to be sold as, human food. In the condition of which I speak the disease has apparently become localised.

Some pathologists do not believe in a local tubercular process, and while it may be defined it cannot be proved with certainty by any method of examination of that body after death. What I mean is this: given a body showing a few tubercles in a fibroid, shrivelled, or calcified condition, to all appearance the disease is local and arrested; still, as a fact, we do not know that it is so, because it is possible that bacilli still inhabit that body. But, while admitting all this, I still incline to the opinion that tuberculosis is frequently a local disease. If it were not so the excision of tubercular, or more frequently termed scrofulous, joints, the scooping out of the interior of tuberculous bones, and the removal of tubercular glands, now so frequently performed on the human subject, would be of no avail, and we all know that in a large number of cases it is a success, and individuals so operated on have lived for years thereafter, and ultimately died without presenting a symptom of lung or bowel consumption.

It is, I admit, a serious position to advise the profession to take up, viz. that the carcases of cattle in whose organs fibroid or calcified tubercles may be found are notwithstanding fit for human consumption, and should be allowed to be sold for that purpose; but I must be allowed to hedge the privilege of sale around, and to the extent which I consider, comparatively speaking, safe to those who eat the flesh.

In the first place, upon whose shoulders is the grave responsibility of passing or condemning flesh food to rest?

It is a responsibility involving an enormous amount of the nation's pecuniary means on the one hand, and the nation's health and strength on the other. To an impartial and unprejudiced mind I apprehend the duties of the office fall, as it were, by inheritance to be discharged by the members of the veterinary profession, but

I would advise no veterinarian to offer his services, or Local Authority to accept of them, who had not specially prepared himself for the efficient discharge of the duties.

To speak of policemen, butchers, or any other body of non-professional men, discharging the duties efficiently is utter nonsense. Such persons may be made valuable assistants in the labour, but to depute to them the disposal of carcases is an act of cruel injustice to the proprietors of our herds and flocks and to the public who consume their flesh.

Having placed at the head of affairs a duly qualified and properly trained veterinarian, we now proceed to deal with the disposal of the carcases, and, firstly, *condition of body* should be set aside, and, not, as at present, made as it were the pivot on which all judgment and action proceeds.

Given a case, for example, of acute tubercular pleuritis or tubercular peritonitis just commencing, and in the primest fat ox, in my opinion, every part of the carcass should be condemned, and with as little hesitation as in the case of a lean, emaciated beast. We order condemnation because we believe that this form of pleurisy or peritonitis—which an expert can recognise with his naked eye—is dependent on the irritation set up by the presence of the bacilli in these great lymph-sacs. We believe that they are there in their thousands, and if only a short time be given they would destroy life.

It has been attempted to be shown that we cannot with the naked eye distinguish between simple acute pleurisy and acute tubercular pleurisy, but those who have studied the subject find no difficulty in doing so, and even were it the case that a single bacillus could not be found under the microscope, we would not hesitate in maintaining our diagnosis. But bacilli are there, and if care and knowledge be brought to bear in their detection they will always be found—at least such has been our experience.

The animal, we repeat, while living, may have appeared in the best of health, and been sold by the breeder and bought by the butcher as a typical representative of a prime fat ox or cow, and still, when slaughtered, we order the condemnation of the carcass, because even in the earliest stage of acute tubercular pleuritis or peritonitis, if the tubercular exudate be inoculated on or ingested by a sound animal, it will fall a victim to general tuberculosis, and further, because the fat but affected animal itself, if allowed to live, would become emaciated, and also die a victim to tuberculosis.

Some parties apparently believe that the disease can only be a local affection as yet, seeing the carcass is in such prime condition, and they consider that those who are to eat the flesh are sufficiently protected by the removal of the pleural and peritoneal membranes on which the tubercular exudate has been poured out, but may not the bacilli and their spores be circulating in the lymphatics and blood-vessels which communicate with the pleural and peritoneal cavities?

That they are not, those who say so, and it may be believe so,

have no proof to offer; but that they are circulating, those of us who believe so have proof to offer in the fact that tubercles have been found growing in the walls of the blood-vessels and lymphatics, and even in the medulla of the bones.

Professors Klein and Lingard "have found that in tuberculosis artificially produced by subcutaneous inoculation in guinea-pigs one of the earliest tissues containing tubercles and the tubercle-bacilli is the marrow of bones," and I have found tubercle and tubercle bacilli in the marrow of the bones and in the muscular tissue of a fine prime fat ox.

By what channels can the bacilli or their spores from a point of inoculation locally situated, reach the marrow of bones, the lungs, the covering of the brain, the bowels, and other tissues? By no other channels at present known to us, except the blood-channels and in the blood-stream. Upon this all-important point allow me to quote a passage or two from Professor Klein:—"This conclusion at once disposes of the assumption occasionally made, that if in an animal the lungs and thoracic lymph-glands are the only organs visibly affected with tubercle, the removal of these viscera is sufficient to ensure the safety of the rest of the animal's body, as far as its usefulness for consumption is concerned. Though we may not by naked-eye inspection, or even by microscopic examination be able to detect the tubercle bacilli in the muscle or connective tissue, how can we be justified in excluding their presence from the circulating blood, including the blood in the vessels of the muscles and connective tissue? What would be our reasons for saying that at the time of killing the animal the tubercular virus is not circulating in the blood, and is not in transit to distant localities, say, to the marrow of the bones or other tissues destined in the natural course of things to become the seat of tubercular deposit? It must be clear from these considerations that no part of an animal in which even a single organ is visibly affected with tubercle can be held free of the tubercular virus."

Now that attention has been particularly directed to the circulation of the bacilli, I have no doubt but that tubercles will be found frequently in the marrow of the bones and in the lymphatics of fat and apparently healthy subjects prior to slaughter. Bodily condition, fatness or leanness, I repeat, should not in the least influence the inspector's opinion in disposing of the carcass of an animal affected with acute or generalised tuberculosis.

We would also consider and condemn as unfit for human food any carcass, irrespective of condition, in which the tubercular deposit was found to have invaded rather extensively any organ, and although to all appearances the disease was localised.

I quite agree with Professor Klein in the view "that no part of an animal in which even a single organ is visibly affected with tubercle can be held free of the tubercular virus and free from danger to the consumer."

It is self-evident that perfect safety can only be ensured by destruction of all carcases tainted with the disease, but I am scarcely

prepared for such a sweeping reform, nor do I believe such a measure will be generally enforced.

Under the conditions I have stated the public would be prevented eating the flesh of tuberculous animals to a large extent, and the stock proprietor and dairyman, instead of as at present looking helplessly on and allowing his tuberculous subjects to pine away from day to day, would awaken to the importance of instantly slaughtering all animals showing the slightest symptoms of the disease and adopting a more enlightened system in the breeding, housing, feeding, and exercising of his cattle.

I do believe that tuberculosis, especially in cows, is largely a preventable malady, and that the housing of them in close, badly ventilated cowsheds, the feeding of them upon brewer's grains in order to obtain the largest amount of milk, and the absolute want of physical exertion, as is the case in most town dairies, are the reasons for the extreme prevalence of tuberculosis in cattle as compared with all other animals.

If milch cows are kept tied up to the stake, as they are in Glasgow, from the day they enter the cowshed to the day they are taken to the slaughter-house, need we wonder that the lungs of many of them show tubercles? The want of pure air and exercise is just as obviously the predisposing cause of the tuberculosis in their case as in that of wild animals caged up in menageries. West Highland cattle rarely present tubercles in their lungs on slaughter. Wild animals in their forest homes are all but exempt from tuberculosis, but in menageries no disease destroys so many as tuberculosis.

Now that Local Authorities are required to slaughter all herds in which pleuro-pneumonia gains a footing, veterinary inspectors will have an opportunity of giving statistics of animals affected with tuberculosis, and it will be interesting to note the wide differences in the various herds. In Glasgow dairies, as far as we have gone, it ranges from 20 to 25 per cent.

And now I desire to direct your attention to the question of compensation:

The principle of compensation for animals slaughtered affected with a contagious disease has been conceded, and is in operation, and I hold that no valid reason can be adduced why tuberculosis should not be included in the list of scheduled diseases and the animals affected dealt with on the same lines as when affected with pleuro-pneumonia.

The public health would be more benefited by the slaughter and condemnation of animals affected with tuberculosis than pleuro-pneumonia, for I have yet to learn of any harm having arisen to the public by eating the flesh and drinking the milk of pleuro-pneumonic cattle.

As business is at present conducted in the sale of animals for human food the butcher is the greatest sufferer by this disease, and he is, to my mind, justified in raising every objection to the wholesale condemnation and confiscation of the carcases of the animals

he has purchased until an arrangement has been made whereby he will be reimbursed his pecuniary loss.

The victim of tuberculosis is frequently of considerable pecuniary value, and generally it is bought at a full value and in open market. No protection has been given the butcher in making his purchase, and it is, to say the least, very hard to find that after he has paid his money and is only attempting to regain it, with interest for his labour, by the disposal of the carcass for the purpose for which it was legally purchased, that his honest earnings—and it may be his all—are swept away, and his position and character seriously imperilled.

As you are aware the evidence laid before the Departmental Committee of the Privy Council, and the finding of that Committee were both in favour of the inclusion of tuberculosis in the list of scheduled diseases, and the granting of compensation as in pleuro-pneumonia.

The findings of the Departmental Committee are so important and so clearly expressed that they should be known to all, and in case they may have escaped the memory of some here present I have much pleasure in making the following quotations:

"In order to ensure the gradual extirpation of tuberculosis, we are of opinion that it should be included in the Contagious Diseases (Animals) Acts for the purposes of certain sections of those Acts, so as to provide:

(*a*) For the slaughter of diseased animals when found diseased on the owners' premises.

(*b*) For the payment of compensation for the slaughter of such animals.

(*c*) For the seizure and slaughter of diseased animals exposed in fairs, markets, &c., and during transit.

(*d*) For the seizure of diseased foreign animals at the place of landing in this country.

"The powers and responsibilities of inspectors in ordering the slaughter of diseased animals should be the same for tuberculosis as for pleuro-pneumonia.

"An additional argument in favour of the slaughter of diseased animals is to be found in the fact that frequently tuberculosis and pleuro-pneumonia actually occur together, or are mistaken one for the other, so that in either case slaughter would be highly desirable.

"Further, tubercle, though hereditary, is nevertheless much less contagious than the other diseases included under the Act of 1878, and it is clear therefore that the immediate slaughter of diseased animals would go far to stamp it out, though doubtless, owing to heredity, the stamping-out process would be gradual in its effect.

"The annual reduction of the disease would probably be very considerable, and even should it not be so, that would not constitute any reason against the adoption of the proposed regulations, since, however small the effect produced, the result to the nation must necessarily be gain.

"As in other diseases scheduled in the Act of 1878, so in this, the owner should be compensated for the slaughter of a tuberculous animal at the rate of three fourths of its value before it was slaughtered, and the valuer should shape his estimate according to its worth to the owner, *i. e.* as a milk producer, or for any other special purpose."

And now in conclusion, permit me to say that as it was only after considerable pressure had been brought to bear on the Lord President of the Council (by representations in writing and deputations from various Local Authorities headed by Members of Parliament), that a Departmental Committee was appointed to consider this disease and other pressing questions, so it will only be after renewed pressure is brought to bear that the Government will adopt the recommendations of that Committee, and such being the case, the sooner the Local Authorities set about applying that pressure it will be the better, not only for all parties pecuniarily concerned, but for the nation at large.

YORKSHIRE VETERINARY MEDICAL SOCIETY.

The summer quarterly session of this Society was held on July 19th at the Queen's Hotel, Leeds, the President, Mr. W. Lodge (Dewsbury), in the chair; and there were also present Messrs. Jos. Carter (Bradford), G. Carter (Keighley), W. Briggs (Halifax), A. W. Mason, G. Bowman, and W. F. Greenhalgh, Hon. Sec. (Leeds), J. Scriven, Hon. Treasurer (Tadcaster), H. Snarry and G. T. Pickering (York), G. Clarkson (Aberford), S. Chambers (Kirkheaton), members of the Society; and Dr. Watts (Medical Officer of Health, Dewsbury), Mr. T. Exley, M.R.C.V.S.; Messrs. E. Anderton and P. F. Falshaw, visitors.

Letters of apology for non-attendance were read from Professor Axe; Messrs. Bale (Otley), Axe (Doncaster), Longhurst (Hull), Kidd (Hungerford), Deighton (Riccal), Danby (Bainton), Hardy (York), Greaves and Faulkner (Manchester), Scott (Harrogate), Freer (Uppingham), and A. Leather (Liverpool).

The minutes of the last meeting were confirmed.

Mr. G. Carter proposed Mr. Longhurst (Hull) as a member of the Society; seconded by *Mr. Mason* and carried.

Mr. Scriven proposed Mr. Gavin Scott (Scarborough) as a member; seconded by *Mr. Mason* and carried.

Mr. Greenhalgh nominated Mr. T. Exley (Leeds) as a member of the Society.

Empirics as Meat Inspectors.

At the last meeting of the Society a Committee was appointed to consider the question of the appointment of empirics as

meat inspectors, &c.; and the recommendation of the Committee was submitted in the following form for adoption:

"At a meeting of the Yorkshire Veterinary Medical Association, held in Leeds on July 18th, the question of official meat inspection, and of the oversight of cowsheds and dairies, was introduced and discussed. It was decided then to point out to the various Local Sanitary Authorities throughout Yorkshire the importance of these matters, and the necessity for substituting duly qualified veterinary surgeons for policemen and empirics generally as meat inspectors; and at the same time to recommend to the various sanitary authorities the advantages which must accrue from such a reform of the existing arrangements. The reasons set forth were that an efficient inspector of meat must, *primâ facie*, be a good comparative pathologist; that the superficial knowledge of meat inspection displayed by policemen and empirics is an item of serious danger to the public health, and not unfrequently is attended with unfairness to the butcher; that it is essential for the proper inspection of butchers' meat that an extensive and definite knowledge of anatomy, such only as a complete course of veterinary studies can guarantee, should be exercised; that only those who have thoroughly studied the structure, composition, and general features of animals in health and in disease by the aid of chemistry, the microscope, and other scientific methods and accessories of investigation, such as modern science has placed in the hands of the veterinarian, are competent to pronounce upon the soundness or unsoundness of the flesh of animals for human consumption."

Mr. J. Carter expressed the opinion that the recommendation of the Committee was a step in the right direction, but he was afraid more pressure would have to be put on the Local Authorities before they adopted it.

Mr. G. Carter remarked that the subject had been well considered by the Committee, and they came to the conclusion that the recommendation as drawn out by Mr. Briggs was such as the Society intended should be placed before them There had also been an expression of opinion that if the various hon. secs. of the different veterinary medical societies throughout the country would bring the matter forward for discussion at their meetings, and pass a similar resolution to that which had now been submitted, it would be productive of very great benefit to the profession. (Hear, hear.) He proposed that the resolution of the Committee be adopted and acted upon.

This was seconded by *Mr. Mason*, who thought the secretaries of the various veterinary societies might inform them as to any action those societies might take. The resolution was carried unanimously.

Notice to Members.

The *President* stated that there was a rule in the Society to the effect that members not attending, and not sending apologies,

should be fined, and he thought it desirable that in future the rule should be put into effect. (Hear, hear.)

Specimens.

Mr. Briggs exhibited bones showing a fracture of the atlas and dentator.

The *President* then read the following paper on "Tuberculosis."

Gentlemen,—In introducing the subject of "tuberculosis" for your consideration I must confess to some amount of hesitation and doubt, for it is a matter of the deepest importance and ought to be dealt with most painstakingly by myself, and also by you my brethren of the profession. I hope, however, you will excuse any shortcomings in this address, and I trust it may be the means of inducing the veterinary profession in Yorkshire to declare what are their views respecting a disease so prevalent as this is among horned cattle, and especially among milk cows. Let me say I am quite convinced it is time the veterinary profession should see that some steps are taken to eradicate entirely out of the country this most baneful disease. You might also, I think, come to some definite understanding as to who are most competent to give authentic and therefore reliable opinions as to this disease, when its existence is suspected or alleged, and should be scientifically investigated. It is a baneful malady peculiar to cattle, and is it not discreditable in the eyes of the public, that when called upon to give evidence before the magistrates, veterinary surgeons are often found giving conflicting evidence upon a state of facts which are admitted by both sides to be accurate? Can we depend upon having the confidence and respect of our clients so long as such is the case? It is in order, if possible, to avoid such a contrariety of opinion, especially in the presence of judicial tribunals, that I invite you to assist me in a thorough and enlightened deliberation as to what tuberculosis really is, what it leads to, and what is the prerogative of the veterinary surgeon when cases of this kind arise. Not only do I hope there will be an animated and exhaustive discussion to-day, but that even after this meeting is over, should any fresh experience arise or additional knowledge be obtained, those of us who are in possession of it will take care that it is recorded as early as possible in the recognised public journals devoted to the profession. In reading over the evidence in the recent diseased meat case at Glasgow, I was very much surprised to find that nearly all the inspectors of meat whose evidence was taken were medical gentlemen. Now, with all respect to them, I am compelled to say that I cannot for the life of me understand why they allow themselves to be placed in a position which even from the point of professional etiquette they ought to shun. If their candour were appealed to, they would, I doubt not,

admit that we have a domain of our own, and rights and privileges exclusively ours, and why they should intrude upon them entirely passes my understanding. Men like ourselves, gentlemen, who are trained and skilled as to soundness of animal flesh cannot but be more competent to give evidence in cases like that I have referred to than the family surgeon, who is only asked to interfere in such matters occasionally, and in order to bolster up a doubtful case. There are, I contend, abundant reasons why veterinary surgeons should exclusively be admitted as professional witnesses in such cases, and more particularly why they alone should be called to the office of meat inspector. (Applause.) Let me ask you now, gentlemen, to consider with me, what "tuberculosis" is, and I would propound to you the following questions:—1st. What is tuberculosis and how does it affect cattle? 2nd. Is it infectious? 3rd. Is it possible to be taken into the system by ingestion? 4th. Is it hereditary? 5th. Would you consider the milk fit for human consumption if taken from a cow affected with tuberculosis, whether the udder is affected or not? 6th. Would you consider the flesh of an animal affected with tuberculosis either in its first or the advanced stage fit for human food? 7th. Is it essential that tuberculosis should be brought within the operation and provisions of the Contagious Diseases (Animals) Act, with a view especially to compensation being paid to the owners of animals which have to be compulsorily slaughtered? As to the first point, my definition of tuberculosis is that it is a febrile disease attended with greater or less diffusion of granular deposits which give rise to a slow local inflammation by the irritation which they excite. You will often find narrow-chested animals with long legs, those in which the disease is most apparent. You will notice that they hang down their heads, and have a weak hoarse cough which is repeated if they are driven about quickly; the eyes often are bright and staring, the skin dry and harsh, and if the animal be a white one, the skin, it will frequently be perceived, is of a yellow colour. They are as a rule capricious feeders, the bowels respond too easily to the action of laxatives, and the milk, besides being thin and bluish, soon turns sour, while in pregnant animals abortion ensues, and in other cases irregular œstrum occurs. 2nd. Is it infectious? In my opinion there can be no doubt that it is very infectious. I have seen several cases on one farm. The farmer has kept a cow suffering from tuberculosis for some time and gradually the disease has extended to the others. As to the third proposition, Is it possible this disease can be taken into the system by ingestion? I must admit that upon this point I am not prepared to give a definite answer. I must declare it to be my opinion, however, that the disease can be taken into the system by ingestion. Now, my fourth point is, Is it hereditary? My opinion is in the affirmative, but at the same time I have no proof to adduce further than in particular

breeds, shorthorns, for instance, it appears to be most prevalent. Fifthly, Would you consider the milk fit for human consumption if taken from a cow suffering from tuberculosis, whether the udder is affected or not? Now, I certainly think that the milk taken from a cow affected with tuberculosis should not be used for family purposes. In several cases I have ordered to be destroyed animals which had become wasted and very thin, although they were giving milk rather freely. If we reflect for a moment how much the juvenile population are nurtured upon milk, we shall feel in honour bound to protect them as respects the wholesomeness of the food administered to them. I would not for a moment declare that tuberculous matter would produce phthisis, but I am perfectly sure that it is very likely to bring on diarrhœa and sickness. In the cases of children fed from a bottle is it not frequently the case that they look pallid and emaciated, and may not this be the result of the liquid they are imbibing being either diseased or too much diluted? Now coming to the sixth suggestion I threw out I must avow I do not consider animal flesh fit for human food if impregnated with tuberculosis to any extent. Mind you, I use the proviso "to any extent," by which I intend to convey that when an animal has become wasted, and nearly all the organs of the body are more or less diseased, then the meat should not be allowed to come into the market, but I do think when an animal is fat and in good condition, and when the lungs are the only parts affected, that the carcass might be used for human food. In such circumstances we often find the tubercle encysted, or that it has become of a cheesy nature, in which case I consider no harm could be done. On the other hand, however, so soon as the glands indicate the presence of the disease, I believe that the virus is on the march, and will soon do its pernicious work. As to the seventh point which I have offered for your consideration, I must say that I consider it very essential for the welfare of the country at large that tuberculosis should be comprehended within the Contagious Diseases (Animals) Act, whereby I think the most effectual means would be provided of stamping the disease out. It is my belief that an aged cow kept upon a place for any length of time affected with tuberculosis is likely to be very contagious to the neighbourhood. If there were legal powers to prevent such an occurrence as this, the milk consumers would most likely have the advantage, to a greater extent than at present, of being supplied with good pure milk, and they might possibly also have the satisfaction of recognising a surface of cream such as rarely at present comes within their culinary experience. (Applause.) Now, thanking you, gentlemen, for your kind attention to these remarks, and sincerely hoping that good results may ensue both to our profession and to the public at large, I have now to invite discussion on this subject, which all must admit is of national and paramount importance. (Laughter and applause.)

Mr. J. Carter thought the subject of tuberculosis required a great deal of investigation. It was quite time something should be done in the matter. Very few members of the profession had perhaps seen so many cases of tuberculosis as he had, and there was no doubt that where the disease existed in an advanced stage the meat should not be used for human food. He had seen two cases recently at York. The animals had only been purchased three weeks, but the lungs of one animal bore abscesses the size of his hand, but it was not altogether hollow. The animal was nearly a skeleton. The other was nearly as bad, and the milk from, or the milk of, such animals was unfit for food.

Mr. Mason remarked that he was connected with the celebrated Glasgow case. He believed the great question they had to consider was at what stage of the disease they should condemn, and at which pass. The lungs of one of the animals were affected, but they were firm and the disease was in the encysted stage. The carcass of such a beast he should have felt justified in certifying as fit for food. With regard to the other he could find out nothing about it,—there was no disease about it whatever. There was a rosy hue on the left costal membrane, but they often found that in the case of animals that had been overdriven, and there was no organic disease whatever about the carcass; in fact, it was one of the grandest of carcases he had ever seen. They, he believed, as veterinary surgeons had always passed carcasses as fit for food when the animal was suffering from tuberculosis in the early stage, but the scientific gentlemen who gave evidence at Glasgow stated that it did not matter in what stage—an animal suffering from tuberculosis must be condemned and destroyed—it was not fit for human food. It was clear that even amongst themselves as veterinary surgeons there was great difference of opinion at present as to what stage an animal suffering from tuberculosis should be condemned as unfit for food. In his opinion they had a good deal yet to learn as to this disease, and no satisfactory conclusion could be arrived at until there had been much more scientific research, and the subject had been thoroughly thrashed out. He thought great credit was due to their President for having brought the subject before them for discussion.

Mr. Scriven expressed the opinion that domestication under certain conditions conduced to the disease.

Mr. Mason asked if any of those present agreed with him that the disease was more prevalent now than it used to be. He would like to know whether they thought the present mode of feeding and housing had anything to do with the disease.

Mr. J. Carter said he found the disease more prevalent among the thoroughbred shorthorn breed.

Mr. Scriven was of opinion it was only found to exist in animals fed on brewers' grains and housed for extended periods, and milked to the last extremity.

Mr. Mason said he had asked about feeding because of the following comments appearing under the heading of "Agricultural Notes" in the *Yorkshire Post* of that morning:

"Reference may be made to the director of one of the French laboratories, who stated his belief that cows fed upon grains become diseased in a short time, that although this food conduces to the supply of a larger quantity of milk, yet that that milk is watery, by no means so nutritive, and probably productive of consumption in man, while it is certainly unwholesome. This statement seems to have excited alarm, and protests were made against it, but a well-known French investigator (Dr. Toussaint), who is quoted by the Agricultural Adviser to the Privy Council, made certain inquiries, the results of which he stated in print. One of his suggestions was that a cow which has furnished by a special course of feeding a quantity of milk in excess of what she would furnish naturally in the same length of time, produces a fluid with an abnormal secretion, and which persons of delicate stomachs cannot consume. Again, he says milk produced from cattle feeding upon grains is milk which results from an artificial kind of feeding. It is consequently artificial, and loses some of its most desirable qualities. Then he remarks that the milk of cows fed upon grains is of bad quality, and should be absolutely rejected as a food for infants of tender age, and yet brewers' grains are one of the most general of foods used by the producer of milk for town consumption, and for two reasons, first, because it produces quantity, which the dairyman desires to obtain without much regard to quality, and next the grains can be kept for a very considerable period, and are in very many instances purchased when they are cheap, and preserved in pits for use during the winter season. We have repeatedly seen grains taken from these pits for mixing with the food of the cattle, when they are not only extremely strong-smelling and as objectionable as any food can be, but abominably sour and partially decomposed."

Mr. G. Bowman said he had no doubt the disease was infectious. It was taken into the system by ingestion. With regard to the milk, he thought it was injurious if the udder was affected in any way. It had been decided at Glasgow that no animal affected with tuberculosis was fit for human food, but in Leeds if an animal had been affected with tuberculosis, and the disease was localised, and the lungs not in an encysted state, the carcass had been passed as fit for food. He mentioned a case in which a butcher that week had given £17 or £18 for an apparently healthy bullock, but on being killed it was found to be affected with tuberculosis and the carcass was destroyed.

Mr. Carter.—Does he get any compensation?

Mr. Bowman.—Not a shilling. Continuing, Mr. Bowman said he believed the Leeds butchers had drawn out a petition to be presented to Parliament, requesting that the disease of tuberculosis should be ranked in the Contagious Diseases (Animals) Act, and pointing out that where beasts suffering from the disease

were pronounced unfit for food, compensation should be paid to owners for the destruction of the carcass.

Mr. Clarkson.—To what extent?

Mr. Bowman.—To the full extent.

Mr. Clarkson.—Would it not be an inducement for butchers to purchase such animals?

Mr. Bowman.—Well, I really cannot say.

Mr. G. Carter thought the subject so ably introduced by the President was a very serious one, and one which he thought was deserving of their earnest attention. They would benefit to a great extent in their study of the disease by all the assistance they could obtain from the sister profession. There could be no doubt that tuberculosis was a specific disease, and it was transmitted only by the admission of the spore into the system of the animal that took it. With regard to the system of feeding and housing, animals were affected with tuberculosis that had never been housed at all. He had found tubercular meningitis affecting the mesenteric glands when there had been diarrhœa, and he had found tuberculosis in young cattle. These could not be taken to be produced by high feeding or milking. A medical officer of health had expressed the opinion to him that a great many children died every year from consuming milk from tubercular cows. He (Mr. Carter) asked if the officer knew of any children who had suffered from the consumption of such milk and had recovered. The medical officer replied that he could point to two who were now fourteen or fifteen years old, and who had never shown any further symptoms of the disease. He (Mr. Carter) asked, if the medical officer considered the children had suffered from the effects of tuberculosis, did he not think they would in all probability have shown some further symptoms of the disease? and the medical officer replied that he thought they had not lived it down, but he could give no definite opinion. They were all agreed that tuberculosis was infectious, but from that fact he did not think they had a great spread of the disease. He thought it was mostly from the hereditary taint in animals, the consumption of milk from tubercular cows by calves. He did not think the infection was spread much by the air, although he had known cases in which it undoubtedly had, but undoubtedly it was possible to be taken into the system by ingestion. In his opinion, if the udder was not affected there was no danger in using the milk. If there were any tuberculosis in the mammary glands whatever he would condemn the animal, but if the animal was affected with tuberculosis locally, in the lungs and the pleural membrane, and he found no evidence of tubercular deposits in any other part of the body, and the animal was well nourished and the flesh firm, he would say it was fit for human food. If it was possible for phthisis to be produced in human beings by the consumption of animals affected with tuberculosis, why, he asked, did they not find more cases of it in the human subject? Was it not a fact, he asked, that phthisis in the human species

was decreasing? Seeing the large number of animals that were affected to a slight extent with tuberculosis, and consumed for food, it looked very strange that there should not be more cases of phthisis if it could be produced by the consumption of tubercular flesh. If there were any tubercular deposits in any part of the flesh, or the animal was poor and weak, and the flesh did not sit well, he would condemn it, but if no suppurative changes had taken place he would pass it.

The *President* referred to the difficulty of diagnosing cases of tuberculosis, and of the danger of confounding the disease with pleuro-pneumonia. Time after time he had been confident he had a case of tuberculosis to deal with, and it had ultimately turned out to be pleuro-pneumonia, and *vice versâ*. He thought they would agree with him, that in many cases it was impossible to diagnose whether they had a case of pleuro-pneumonia to treat or tuberculosis. He did not think it was possible to differentiate with certainty.

Mr. Bowman described the case of an elderly man who was suffering from tuberculosis. He had several dogs and was in the habit of chewing meat, and then giving it to his dogs to eat. The result was that the dogs showed every indication of suffering severely from the same disease.

Mr. Mason recollected a case in which a lady suffering acutely from consumption had occasion to frequently use a spittoon. Her dog was in the habit of licking the spittoon, and it ultimately died from tuberculosis.

Dr. Watts (Medical Officer of Health for Dewsbury) said he accepted the invitation of their President to attend the meeting, not to take part in the discussion, but to obtain information on the important subject of tuberculosis. With regard to cases of phthisis, they found it in children not fed very much on milk, but in children belonging to the lower classes, brought up anyhow. He did not say that impure milk from diseased animals would not produce it, but he thought they should not load the cow with too much blame. The question of dealing with the flesh of animals was an important one, and the subject was getting more important because such cases were continually cropping up, and they should have some definite system to work on. When the tubercle was encysted he took it that the disease was in a dormant state, but the disease must still exist in the animal, and the question was whether the animal should be condemned at that time. Unfortunately, perhaps, as a medical officer of health he was in the particular position which they seemed to deprecate so much.

Mr. Pickering thought, with regard to the infectious nature of the disease, there must at first exist a susceptibility in the subject to the disease, and with regard to the hereditary taint susceptibility must exist as well as defective sanitary arrangements if the disease progressed. With regard to the injurious effect of consuming the flesh or milk of animals suffering from

tuberculosis, he thought it depended greatly upon the quantity of the milk or food taken. Along with the affected meat or milk there were large quantities of other food taken, and might, he asked, it not be that the one counteracted the possible ill-effects of the other? He might say that the conclusion arrived at by the York medical profession was that tuberculosis ought to be included in the Contagious Diseases (Animals) Act, and it was also decided that veterinary surgeons were the persons best qualified to inspect as to the sanitation, &c., of cowsheds. He would like to ask the meeting whether they considered it was necessary that hereditary taint should exist in animals or human beings as a condition of the subject becoming affected with tuberculosis.

Mr. Briggs thought it was clear the disease of tuberculosis might arise independent of infection, and if that was so they would never stamp the disease out if they included it under the Contagious Diseases (Animals) Act. They were perhaps apt to think that it was the animals affected with tuberculosis that went into the market, but he maintained that it was not so. It was hard lines, no doubt, for the butcher who gave £17 or £18 or £20 for a beast, and who ultimately had it condemned on account of its suffering from tuberculosis, but he did not see how the difficulty was to be met by the Contagious Diseases (Animals) Act until it was proved that it was due to contagion, and contagion only. He did not know what their opinion was, but he was under the impression that the disease would accrue from bad surroundings—bad ventilation in a "mistal." It might be only hastening on a complaint latent in the system, but as to that they could not say. He agreed that it was difficult and almost impossible to diagnose some cases of tuberculosis and pleuro-pneumonia, though he never saw the temperature above 103° in cases of tuberculosis yet. With regard to the carcases of animals suffering from tuberculosis, he said he would condemn all such animals, however slightly they were affected with the disease. It did not follow that because a parasite settled on the lungs that the whole carcass was not affected, and all such carcases should be buried, being certainly unfit for food.

Mr. Greenhalgh pointed out that a large proportion of the animals slaughtered—at Leeds at any rate—were affected with tuberculosis to a more or less extent, and if they condemned all of them it would be not only a very serious thing for the seller and buyer, but also for the consumer.

On the motion of *Mr. Briggs*, seconded by *Mr. Scriven*, a hearty vote of thanks was accorded to the President for the able manner in which he had brought the subject before the Association, and the proceedings terminated.

W. F. Greenhalgh, *Hon. Sec.*

THE FITZWYGRAM EXAMINATION.

THERE were ten candidates who competed for these prizes. The written portion of the examination was held in London and Edinburgh on the 12th and 13th of June, and the practical and *vivâ voce* at Aldershot on the 30th of July.

The following is the result and the number of marks obtained by each competitor.

No. of Candidate.		Theoretical.	Practical.	Total.
30	(Dick Veterinary College, Edinburgh)	980	1000	1980
88	(New Veterinary College, Edinburgh)	875	940	1815
*9	(Royal Veterinary College, London)	855	450	1305
*4	Ditto	840	450	1290
18	Ditto	817	800	1617
74	(Dick Veterinary College, Edinburgh)	805		
64	Ditto	775		
89	(Glasgow Veterinary College)	707		
48	(New Veterinary College, Edinburgh)	692		
108	Ditto	590		

N.B.—The five candidates highest in the written portion proceeded to the further or practical portion of the examination.

Result.

No. 30. Mr. A. E. Mettam, First Prize, £50, Dick Veterinary College, Edinburgh.

No. 88. Mr. J. B. Robertson, Second Prize, £30, New Veterinary College, Edinburgh.

No. 18. Mr. E. E. Martin, Third Prize, £20, Royal Veterinary College, London.

*9. Mr. W. A. Byrne,
*4. Mr. J. Beanland, } next in order of merit.

The examiners were Messrs. R. Poyser, A.V.D., Mr. A. Robinson, and Mr. A. W. Hill, *Hon. Sec.*

MISCELLANEA.

THE VETERINARY SCHOOL IN STUTTGART.

"THE Students of the Veterinary School in Stuttgart have unanimously resolved not to attend the school next winter, because the hope that it would be raised to the rank of an academy (Hochschule) on the occasion of the recent celebration of the twenty-fifth anniversary of the King of Wurtemberg's accession has not been fulfilled."—*Lancet.*

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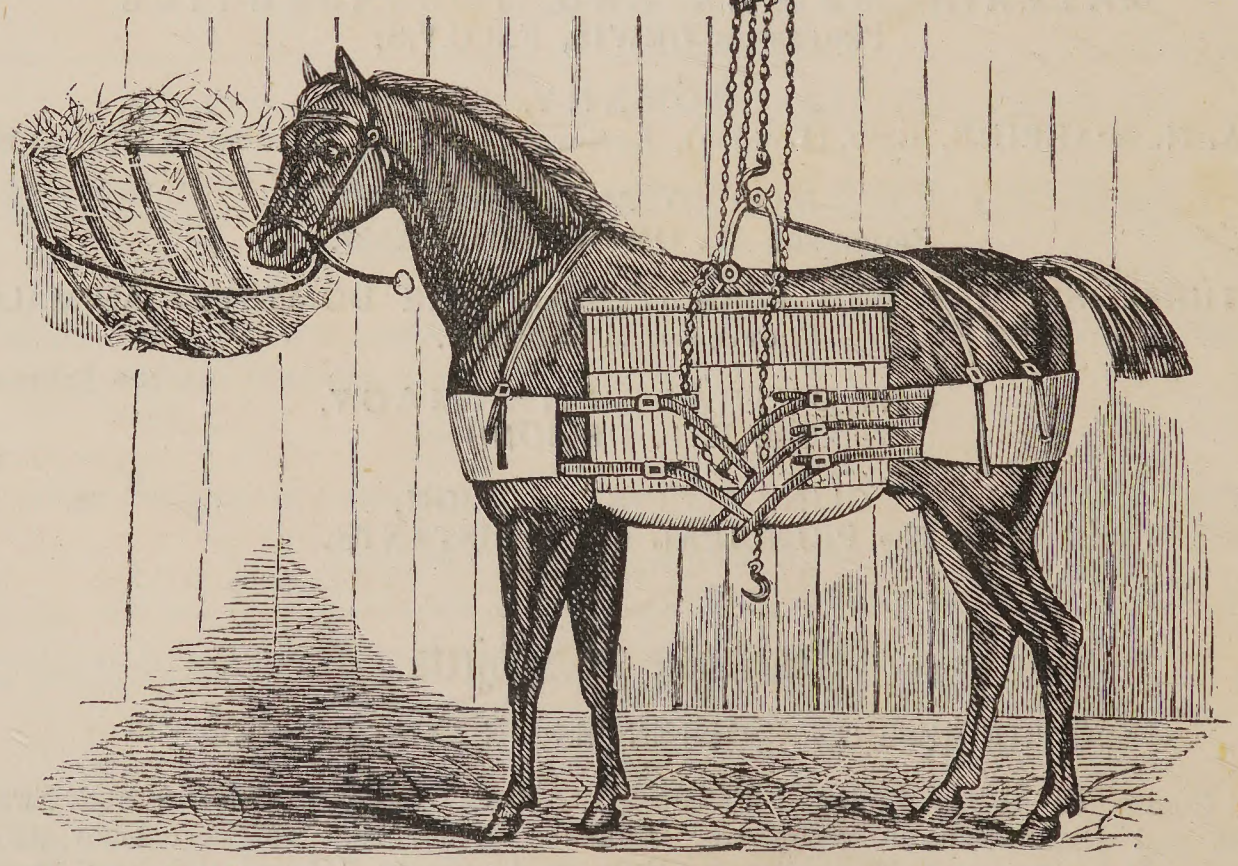

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